The Planters' Chronicle.

RECOGNISED AS THE OFFICIAL ORGAN OF THE U. P. A. S. I., INCORPORATED.

(Secretary's Registered Telegraphic Address "Planting," Bangalore.)

VOL. XI. No. 1.] JANUARY 1, 1916. [PRICE AS. 8.

THE U. P. A. S. I.

(INCORPORATED.)

Contents.

To all our readers we wish a Prosperous New Year, "Hope springs eternal in the human breast" and we can only hope that this year will see the termination of this devastating war.

The Scientific Officer has returned to Head Quarters from his visit to Ootacamund.

We publish an article by the Scientific Department under the heading of "Brown Blight of Tea," towards which Mr. MacRae, Government Entomologist and the Planting Expert have collaborated.

The Proceedings of the Travancore Combined Planters' Association are published.

We publish a very interesting letter from an old South Indian Planter now planting in British East Africa.

We are very glad to publish Mr. Kinloch's letter as a War item, the first that has come to us. We are pleased to publish letters from Mr. Browne in France and Mr. Cavell in Burmah as showing how keenly our "soldier planters" appreciate the interest taken in them.

SOUTH INDIA PLANTERS' WAR FUND.

	Rs.	A.	P.
Amount previously subscribed	29,026	8	0
Mr. R. H. Crowther	10	0	0
Messrs. Barber & Pascoe	75	0	0
Mr. J. A. Anderson	500	0	0
Kaithuritty Valley Church Collection per Mr. J. Stewart	50	0	0
Mr. G. A. Tippetts Aylmer	50	0	0
„ E. E. Broughton, £25	375	0	0
„ E. S. Broughton, £20	300	0	0
„ A. W. Macrae, £100	1,500	0	0
Total Rs...	31,886	8	0

OVERSEAS AIR CRAFT FUND.

Amount previously subscribed	4,058	14	0
Mr. G. A. Tippetts Aylmer	50	0	0
Total Rs...	4,108	14	0

SCIENTIFIC DEPARTMENT, U. P. A. S. I.

Brown Blight of Tea. (COLLETROTRICHIUM CAMELLIAE).

Recently this fungus has become prevalant on Tea estates in the neigbourhood of the Nilgiri-Wynaad and Wynaad districts and it has caused more damage than usual. The effect of a bad attack on old Tea is, by defoliation, to reduce the wood to a weak whippy condition so that there is nothing to prune on to. If bushes of this kind are collar pruned in May suckers grow readily enough, but the foliage of these suckers is apt to be attacked by the fungus again which renders this treatment impracticable and may, in extreme cases, result in the death of the tree.

The fungus has also been noted in two instances on nurseries where it does a considerable amount of damage, causing the death of the weaker plants by attacking the stem and choking up the circulatory system in the bark cells, and seriously affecting the growth of all the plants attacked. On supplies also a great deal of damage may be done by the fungus.

Brown Blight has been reported from Assam, Darjeeling, and Ceylon, and also from Tea growing districts in other parts of the world. In all the districts of Southern India which we have visited this disease is present. Usually it is hardly noticeable and causes but trifling damage, but sometimes it does become severe and causes great loss in a Tea garden.

As a rule no preventive measures are necessary against the disease. Still every one should know the characters of the disease so that he may note if it is increasing on the estate. When such happens it is worth while taking precautions for. Though the spots occur usually on the older feeding leaves, yet they may come on quite young leaves and considerably reduce the flush and even the first leaves appearing on heavily pruned Tea are attacked. In the laboratory the fungus has been got into pure culture and it has been found that Bordeaux Mixture, even in dilute concentration, prevents the spores from germinating. When active measures are required against the fungus on a block of Tea it would be best to pick off as many diseased leaves as possible and to spray with Bordeaux Mixture, which besides being efficient, is the cheapest, safest, and most easily handled fungicide for the purpose.

The appearance of the disease in the field may be described as follows. A small area of the leaf-surface becomes yellowish, this area grows larger and gradually turns dark brown. When the leaf is wet the colour of the spot is very dark, but when the leaf is dry the colour is lighter. Finally the surface in crinkled and brittle, becomes cracked and torn, and pieces fall out, leaving holes in the leaf. The spots may appear on any part of the leaf and on either or both sides. When they occur near the edges of the leaves that are not fully mature the leaves may become curled and twisted. On the surface of older or rapidly growing spots tiny black dots appear arranged in irregular concentric rings. These are clusters of spores of the fungus which causes the disease.

The thin colourless threads of hyphae of this fungus ramify among the cells of the leaf, kill them and feed on their substance. This reduces the amount of the green part of the leaf in which the solutions absorbed from the soil, together with the gases of the air, are built up into starch and other products necessary for the growth and well-being of the plant. Should this process be interfered with to any great extent the plant will suffer from slow starvation.

When the fungus is well nourished and about to produce spores the hyphae aggregate in little groups below the surface of the spot, and when the spores are nearly ripe burst open the skin of the leaf and appear as little black tufts which consist of a few comparatively long dark-coloured barren bristles and many short stalks, each with a spore at its apex. The

spores are colourless, sausage-shaped, and small. Sixteen hundred of them placed end to end in a straight line would measure one inch, while five thousand six hundred placed side by side would measure one inch. This gives an idea of their minuteness and allows one to understand how easy it is for such light things to be distributed. The slightest breath of air, if the spores are ripe and dry, will blow them away and they adhere readily to clothing, tools, and animals small and large.

In the present state of our knowledge it is impossible to say what the original source of the infection on any estate may be. We were unable to find any plant in the jungle or among the weeds attacked by the disease, but this does not mean that such may not exist. The fungus can usually be found on old Tea and it has been noticed for years in every Tea district, but it is only recently that it has caused any particular damage in Southern India. This may be due to climatic and other conditions having been peculiarly favourable for the fungus during recent years, or to other causes difficult to determine. It is just possible that the disease might be introduced into a nursery on the outside surface of the seed, since we have seen it growing on a seed pod, but it could not be inside the seed. Consequently disinfection of seed before sowing would be a good preventive measure to adopt. For many other reasons Tea seed, from wheresoever it may be obtained, should be disinfected before it is swon The method of disinfection is a simple and cheap process. The following is the method recommended by the Indian Tea Association. The Tea Seed is placed in a 0·25 per cent. solution of Formalin for two hours and afterwards taken out and carefully dried by exposure to the air in a cool dry place. During this drying the seeds should be turned over occasionally so as to expose them to the air on all sides. The Formalin solution is prepared by mixing commercial Formalin with water in the proportion of one volume Formalin to 400 volumes of water. Commercial Formalin consists of 40 per cent. solution of Formaldehyde which is a powerful disinfectant.

The following recommendations for the control of the disease are suggested :—

(*a*) *In Nurseries,*

As soon as the disease appears all attacked leaves should be picked off and burned and the plants then sprayed with Bordeaux Mixture. The plants should then be watched and on any signs of the disease reappearing a second spraying should be done. All dead and dying plants should be removed and burned. All the fallen leaves on the ground should also be collected and burned. Slaked lime should be sprinkled on the ground surface of the beds and lightly worked in. At the same time the nurseries should be kept as open to light and air and as dry as is consistent with the well-being of the plants. Watering should be very carefully done and only when absolutely necessary. It is better to give the beds a thorough soaking once a week than to water them lightly every day. Moist conditions and a damp atmosphere among the leaves and crowded plants favourable to the growth of the fungus should be avoided. The surroundings of the nursery should be freed from weeds and jungle and kept as open to sunlight as possible.

(*b*) *Supplies and young clearings.*

If possible the diseased leaves should be picked off and burned; in any case the plants should be sprayed with Bordeaux Mixture directly the disease is noticed. In this case the surrounding older bushes should also be sprayed at the same time. We have been unable to find the fungus on any weeds, but it would be advisable to keep young clearings liable to the attack of the fungus as clean as possible.

(c) *In old Tea.*

When the old Tea is not badly attacked we do not consider it practicable to do anything until pruning time. We recommend that all prunings where the Tea is attacked by this fungus should be burned, and that fallen and dead leaves should be collected as far as possible and burned. Slaked Lime should then be broadcasted at the rate of five hundredweights per acre and the land forked so as to bury in quite clean any refuse that may be left and to clean up the fields. Manures are not likely to have much direct affect on the fungus, except in so far as they may enable the bushes to recover from an attack. Manures which tend to produce a rapid growth of sappy wood and abundance of leaves should be avoided on areas liable to the attack, of the fungus—e.g. nitrates, nitrolim, etc. If Nitrogen is needed it should be supplied in the form of organic manures such as Cattle manure, Poonacs, Fish, etc., or better still green dressings such as Dadap. Manures which tend to produce hard wood should be used, and we recommend the use of Phosphates and Potash, such as mixtures of Basic Slag, or Basic Superphosphate, or Ephos phosphates, with Sulphate of Potash. Wood Ashes might take the place of the latter at present.

The formula for Bordeaux Mixture is :—

5 ibs. Copper sulphate.
4 lbs. Quick Lime.
50 gallons Water.

Dissolve the Copper sulphate in water in a wooden tub or bucket; ***iron or tin vessels must not be used.*** Add water to make up to 25 gallons. Put the 4 lbs. of Quick Lime in a pail and add a few pints of water to slake it, taking care to add only a little water at first. A creamy paste is thus made without any lumps. Add water to make up to 25 gallons. Now mix these two solutions in a wooden tub. The mixture should then be tested. A ten per cent. solution of prussiate of potash (procurable from any druggist) is used for this purpose. A drop of this solution is added to a few drops of the mixture. If free copper is present, which is to be avoided, a reddish-brown colour is produced and in this case a little more lime water must be added till the colouration fails to appear in the test. The mixture is then ready to be used as a spray.

It is important to use only good fresh quick lime, old lime or air slaked lime is not suitable.

When spraying has to be done in wet weather two gallons of the following adhesive should be added to each 50 gallons of the Bordeaux Mixture.

4 lbs Resin.
2 lbs. Washing Soda.
2 gallons water.

The Soda is first dissolved in boiling water and the powdered Resin is added a little at a time while the mixture is kept boiling. Care should be taken that it does not boil over. The solution is boiled till it is clear like coffee when it is ready for use.

The following are approximate prices of the materials used for spraying:—

Sulphate of Copper, soluble brand, guaranteed 99 per cent. pure, in fine granular form, in bags of 100 lbs. each.—Rs.28-8-0 per cwt.

Quick Lime from burnt shells in sealed kerosine tins to ensnre freshness.—Rs. 22 per ton.

Resin in 4 cwt. kegs.—Rs. 20 per cwt.

Washing Soda in 3 cwt. kegs.—Rs. 7 per cwt.

W. MACRAE, *Government Mycologist.*
RUDOLPH D. ANSTEAD, *Planting Expert.*

DISTRICT PLANTERS' ASSOCIATIONS.

Travancore Combined Planters' Association.

A Meeting of this Association was held at the Quilon Club, on Saturday, 11th December, 1915.

PRESENT.—Messrs. J. A. Richardson (Chairman), T. P. M. Alexander, (Vice-Chairman), A. W. L. Vernede, Kanan Devan Hills Planters' Association, F. Bisset, Central Travancore Planters' Association, H. M. E. Howson, Mundakayam Planters' Association, S. Alex. Martin, South Travancore Planters' Association, also Messrs. J. Mackie, representing Messrs. Harrisons & Crosfield, Ltd., Quilon, J. Vickers, representing Messrs. Darragh Smail & Coy., Alleppey, H. H. Jones representing Messrs. Aspinwall & Coy., Cochin, and J. A. Gwynne, Honorary Secretary. *Visitors.*—Messrs. R. Ross, J. Stewart L. G. Knight, Fletcher Norton, R. J. A. Moore and L. A. Lampard.

Notice calling the Meeting was read and the Agenda was as follows:—

1. Forest Land Regulations.
2. Registration of Vehicles,
3. Weights and Measures.
4. Pests Act.
5. Rubber Growers' Association.

Before the general business of the meeting was proceeded with, the Chairman made the following remarks:—

Gentlemen.—"This constitutes the third meeting of the Association and it has been called as we have one or two rather urgent matters to discuss, with which I will deal later.

"Since we last met together many more of our young planters have gone to the Front and already the names of several have appeared in the Roll of Honour which has cast a gloom over many homes and planting districts. The war still continues but we can only hope it will soon be brought to a successful finish and peace declared on the Allies' terms.

"PLANTERS' WAR FUND.—I am glad to see the Planters' War Fund has met with generous support from many but it has not yet reached the figure I hoped to see it at by the end of the year. I notice one or two Coast Firms' names in the latest returns and I hope their example will be followed by others.

"TEA.—During the last few weeks there has been a decided drop in tea prices and they are now down to or possibly below the prices ruling before the war. No one can predict what is going to happen after the war and it is the duty of Superintendents to practice every economy in the interest of their estates. There is one direction in which we can save our Companies and proprietors a considerable outlay in these times of shortage of money and that is by restriction of advances but to do this we must have absolute combination. I am quite aware the combination is a thing almost unknown amongst planters but the first step towards this is that every Proprietor and Company should insist on their Estates belonging to their local Associations. Unless they do so, matters of vital interest to the District cannot be profitably discussed, so long as a number stand out these matters are discussed by factions and the gap widens and an unhealthy rivalry is the result.

I can only ask you, Gentlemen, to consider what it would mean to an average Estate employing say 600 coolies if advances per head could be reduced by even a third which I am perfectly certain could be done if we are prepared to back one another up. I do not wish you to think that I am speaking against any particular district, as of course, I am quite aware that some Districts are fortunately placed with local labour and their advances are low but there are others not so fortunately situated where advances are higher and where by combination they might be reduced,

"I am afraid my ardour for combination has rather led me off the rails but I hope you will excuse me.

"RUBBER.—Rubber prices have not fluctuated to the same extent as tea during the war but are now standing round about 3*s*. per pound according to latest reports from London,

"I have been attacked by the Mundakayam delegate to the Bangalore Meeting for what he calls my "most damaging remarks on rubber in South India" at the Bangalore Meeting. I certainly said our climatic conditions were not as favourable as Ceylon and the Straits. In the last *Chronicle* we have a very interesting chart showing the yield in comparison with the rainfall in the Straits and Ceylon, and I should very much like to see a similar chart worked out for South India.

"A correspondent to the *Chronicle* signing himself S. D. also attacked my remarks and tried to infer that the small crops secured to date are due to over-tapping and close planting. There are faults I am sure almost all will confess to but I should like to ask S. D. whether Ceylon and Straits will deny similar faults in their rubber Districts. As regards too close planting we are most of us trying to remedy this by thinning out and I must say the standard of tapping in the Districts I am personally acquainted with, shows very great improvement.

"I stick to my opinion that if we can ultimately secure a yield of 300 lbs. per acre at a cost of 8*d*. with our low capitalisation in South India we should have nothing much to grumble at in spite of our rather heavy rainfall.

"HOME FREIGHTS.—This is perhaps one of the most serious problems we are faced with at the present moment. Rates of freight are not only increasing rapidly but there is every prospect of there being the greatest difficulty in getting steamers in the near future and the outlook is far from satisfactory.

"We have several matters on our Agenda to discuss; so I am not going to take up your time with any further remarks at present."

On the matter of the Forest Land Regulations, the Chairman continuing said:—

"As you are aware the Travancore Government at present are demanding over and above the original land cost of Rs. 25 timber value for the standing timber on the land which may mean anything from Rs. 600 to a Rs.1000 per acre. I need hardly point out that if this rule is insisted on it will absolutely close down all prospects of planting developments in the State."

The meeting went into Committee when the matter of appointing a Deputation to meet H. H. Government was agreed to.

Mr. Mackie proposed the following Gentlemen:—The Chairman, Mr. A. W. L. Vernede and Mr. J. Stewart.

This was seconded by Mr. Howson and carried.

REGISTRATION OF VEHICLES.—The Chairman in introducing this subject said:—

"This matter has been brought up by Mundakayam Association and has received support from several others and at the request of the Peermade Association I made enquiries as to the possibility of getting a Regulation passed for the Registration of all vehicles throughout the State.

"I may mention that at present we have the Hackney Carriage Act in force in Trivandrum which covers all vehicles used for hiring purposes. If we wish it, we could, no doubt, have this extended to the various towns but I do not think this would help us very much, as it would not cover carts and vehicles outside the Municipal boundaries of the various towns the Regulation was applied to and I do not think there is any possibility of getting a general Act as proposed by Mundakayam Association."

Mr. Howson also addressed the meeting and after the matter was fully discussed Mr. Mackie proposed the following resolution which was seconded by Mr. Howson and carried.

"That this Association request that His Highness' Government be good "enough to take up the questien of the Registration of all vehicles plying for "hire in the State and to point out that by issuing licenses as is done in the "case of Wallums, a considerable revenue would accrue to the State."

WEIGHTS AND MEASURES.—The Chairman informed the meeting that certain amendments are proposed to the Regulation controlling weights and measures in the State and as this is likely to be a matter of importance especially to those districts who purchase their rice supplies in British India, the Travancore Government should be asked to recognise all standard weights and measures sanctioned for use in British India. The following resolution proposed by Mr. Vernede and second by Mr. Mackie was agreed to:—

"That His Highness' Government recognise all British standard "measures, weights and balances now used in the planting Districts as "certified authorised Travancore Weights and Measures."

PESTS ACT.—A Circular from the U. P. A. S. I was read regarding the Pests Act shortly to be introduced in British India and the Chairman informed the Meeting that a Similar Act was under consideration for Travancore. It was resolved to hold over discussion of this matter till a later date.

RUBBER GROWERS ASSOCIATION.—A welcome was extended to the members of Committee of the branch of the Rubber Growers' Association in South India, whose meeting was called in conjunction with this meeting.

With a vote of thanks to the Chairman, the meeting terminated.

(Signed) J. A. RICHARDSON,
Chairman,

(„) J. A. GWYNNE,
Honorary Secretary.

CORRESPONDENCE.

Spraying.

Deepdene Estate,
Kyambu, B. E. A., November 30th, 1915.

THE EDITOR,
Planters' Chronicle.

Dear Sir,—It was very interesting to me, as an ex-Indian planter of some 14 years' experience, to read in your issue of November 6th, Mr. Anstead's remarks on spraying for leaf-disease. While I was in India, I do not remember ever hearing a word about any effort to tackle leaf-disease: it seemed to be looked upon as a necessary evil. I must admit that personally I never gave a thought to trying to eradicate or mitigate it. Since I came to East Africa some 22 months ago, I have not ceased to marvel that it was not taken in hand in India. Conditions, I admit, are different. Here, in the Kyambu district, we get two distinct rainy seasons; the "long" rains in April and May, and the "short" rains from about the end of October to early December. Both are very uncertain and are neither of them marked by long-continued spells of soaking and unceasing rains. The total rainfall for the year is only 30-40 inches in a normal season, and there is no gradual thunderstormy weather leading to the two dry weathers as a rule. As a result of this, I suppose, leaf-disease does not (as far as I have observed) get the damaging hold on coffee that it does in the parts of India where the S.-W. monsoon has full effect. For all that we get two attacks of it annually; and on coffee which had been unpruned for two or three years, and which was bearing an impossibly heavy crop, I have seen it do more damage than ever I saw in India, even to the extent of killing out-right a large percentage of trees.

In the short time I have been here, I have had to spray three times for the disease, and in each case have *absolutely* stopped the further spread of it and have killed the fungus where it existed. It is impossible for me to say whether, with the long-extended spells of disease as I knew it in India, this is possible, but I can hardly believe that it is not.

We are indebted to a Kyambu planter for our particular brand of spraying mixture. He experimented with Bordeaux Mixture and with the closely-allied mixture which I will mention presently. The former, I believe, was dropped chiefly owing to the large amount of lime required, and lime is very expensive out here: also I think the former was found less efficient. The position may, for all I know, be reversed in India.

Rightly or wrongly we wait here until the familiar golden spots begin to appear under the leaves about the end of the rains: then we bring forth our sprayers and spray. The disease makes absolutely no headway after that. The patches of yellow go black in the centre and spread no further, nor do any new patches appear at all. The disease is finished until after the next rains. The mixture sticks on to the leaves in a remarkably tenacious way, and is quite in evidence many months after spraying, even on the exposed surface of the leaves and after 20 or more inches of rain.

It would be of the greatest interest to hear of experiments being made with this mixture (which I daresay may already have been done) in India. My own experience convinces me that it is an absolute specific out here, and there seems no reason why it should not be so in India. But it is quite likely that ordinary Bordeaux Mixture is equally efficient and perhaps cheaper with you.

I must not occupy more of your space, and will give the formula.

Stock Solution : 40 lbs. bluestone (sulphate of copper), preferably in powder as being more quickly soluble, to 40 gallons water. For use take 4 gallons of stock solution: make up to 40 gallons with water. Then, *and not before*, add enough calcium carbide to neutralise the acidity. I find 14 oz. sufficient for a 40-gallon cask. Stir well on using.

I do not know what chemical reaction takes place on adding the carbide. I wish I did.

There is a curious fact depending on whether the carbide is in lumps or ground up fine. With lumps the carbide sinks to the bottom of the cask, and, after about 6 or 7 minutes, ceases bubbling, leaving a flocculent black precipitate, which after spraying leaves black blotches and spots on the leaves. With powdered carbide the whole lot "boils" violently on the surface and is used up before it sinks down into the diluted sulphate of copper. For some reason, which I should much like to have explained (perhaps Mr. Anstead would do so), the spots on the leaves after spraying are more or less white. The efficiency seems to be the same.

Yours faithfully,

H. L. ANDREWES.

War News.

Parkhurst, 3rd December, 1915.

THE EDITOR,

Planters' Chronicle.

Bangalore.

Dear Sir,—It seems the fashion for fellows who have been "out" to inflict their impressions on all and sundry who have not been lucky enough to join up. So I propose to bore you with a few volumes of impressions!

The number of planters one comes across here, in uniform, is extraordinary. There are eight of us in this Battalion and most regiments have a goodly contingent of the "Tamil Corps"; as a rule we are all looking forward greatly to the day when we shall find ourselves outward bound to the land of totums, coolies, fever etc.

La Belle France, in which land of mud I spent 2 months of delirious excitement, I found to be much over-rated as a health resort—one can become quite bored with the daily round of trenches, whizz-bangs, little and big willies, pip-squeaks, jack-johnsons, etc., and even Archibald's frantic attempts to wing an aeroplane pall on one after a time—as a change to the trenches, we sometimes go back for a rest when we vary the monotony of eating and sleeping by a few mild attempts at Company drill interspersed with hours of strafeing those Hunnish creatures which one encounters in the trenches and in India where their pursuit is known as the Madras Hunt (vide a certain picture post card).

Sniping is a relaxation in which I freely indulged. It is excellent sport, far better than Big Game Shooting and kept me happy for quite a long time till a thoughtful hun presented me with a "Blity Cushy" anglice a slight wound necessitating the recipient's departure to England.

The serious part of modern war as seen in Flanders does not bear writing about. It is a far off unreal nightmare.

I am at present waiting orders to return to the Trenches, an unpleasant prospect in winter.

Yours faithfully,
A. P. KINLOCH.

P.S.—On reading over the above, I am greatly disappointed with it as a literary effort, my first, it is a failure nor does it seem amusing. Still I'll chance it.

S. I. P. War Fund.

27th Punjabis,
I. E. F. A.,
France.

THE SECRETARY,
U. P. A. S. I.,
Bangalore.

DEAR SIR,—I have to thank you for your letter of the 9th ultimo with enclosures duly to hand.

I have spoken to one or two South Indian Planters I have met here and we are all agreed that it is impossible for us to express our gratitude to those planters who, for some reason or other, are unable to serve themselves, but have chosen such an excellent way of proving their sympathy to such of us as have the fortune to be able to do so.

Yours faithfully,
C. E. M. BROWNE.

86th Carnatic Infantry,
Bhamo, Upper Burma,
13th December, 1915.

THE SECRETARY,
U. P. A. S. I.,
Bangalore.

Dear Sir,—With reference to yours to hand dated November 9th, 1915, re the South Indian Planters' War Fund.

I shall have much pleasure in bringing the Fund to the notice of any South Indian Planter I might run across. It is indeed good of the planters to take such a keen interest in the welfare of those of us who have been able to join the forces.

Thanking you for forwarding me the report of the meeting.

Yours sincerely,
R. E. CAVELL.

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(INCORPORATED.)

LABOUR DEPARTMENT.

The Director returned to Bangalore yesterday.

The Chingleput Division will be under the supervision of the Director for the present. All Labour matters for that division hitherto referred to Mr. Clementson, should be addressed to the Director at Bangalore till further notice.

Ceded District Coolies.—Following the system of recruiting advised in the blue pamphlet named circular No. 2 issued in October 1914, Mr. Lincoln of Chickilli Estate, Kadur District, Mysore State, recruited a gang of coolies who have turned out well, and arrangements are now being made to increase their number. In another instance coolies recruited for an Estate in Coorg, where circular No. 2 could not be followed owing to certain circumstances, the attempt was a failure, in spite of every possible care being taken on the Estate to make it a success.

SOUTH INDIA PLANTERS' WAR FUND.

	Rs.	A.	P.
Amount previously subscribed	33,109	0	0
Mr. Percy Church	500	0	0
„ D. V. Crowe	7	8	0
The Honorary Secretary of the Quilon Club being the entrance fee of the Quilon Golf Club's Xmas competition	60	0	0
Total Rs...	33,676	8	0

Mr. H. L. Bracken writes under date Quetta, Baluchistan, 5th January, 1916:—

"I am writing to you to let you know that I have received my orders to take a draught of the 48th Pioneers to the Persian Gulf. I understand I am leaving India on the 12th of this month."

SCIENTIFIC DEPARTMENT, U. P. A. S. I.

Tapping Hevea Rubber.

The following review of A. W. K. de Jong's book on this subject appeared in the *Experiment Station Record, XXXIII, 6.*

The first part of the work describes the various experiments included in a comparison of tapping methods on a number of plots of Hevea rubber trees. The second part describes similar comparative tests on individual Hevea trees.

Among the many results from the investigations as a whole it was found that the method of making the cuts by individual tappers affected the yield of rubber considerably. The thickness of the bast strip removed as well as the direction of the cut, that is from above, below, or *vice versa*, had no material influence on the yield of the cut. The maintenance of a continuous flow of latex depended more on the restoration of capillary action than upon any peculiarity of the latex itself. Neither the evaporation of the latex nor the drying out of the bast had much effect on yield from cuts that were opened daily.

Where cuts one above the other were not more than 50 cms. (19·6 ins.) apart the lower cut averaged the greater yield of rubber. For greater distances than this no effect was noticeable. Wounding the tree resulted in a stronger local formation of rubber. Young bast gave more rubber than old. A left-hand cut appeared to have some advantage over a right-hand cut, but there was very little difference in yield between a "V" cut and a left-hand cut.

A test of cuts of various slopes showed that the cut making the smallest angle with the main tapping channel uses up the greatest amount of bast without giving a corresponding increase in rubber yield. Cuts made in a vertical direction gave only about half the yield of a cut making an angle of 50 with the tapping channel. It made no material difference whether cuts were renewed on the upper or lower side. The opening of one cut above another cut, or alongside another cut, appeared to affect the yield of the first cut, provided the distance between the two cuts was not great. No effect on yield was noticed from cuts made on opposite sides of the tree.

Experiments in which cuts were renewed twice a day showed that the removal of latex from the capillaries of Hevea trees takes place locally. The equilibrium of the capillary action is broken down about four hours after the first renewal.

Work of the Scientific Department of the Indian Tea Association.

At the Annual General Meeting of the Assam Branch of the Indian Tea Assseiation held in November 1915, Dr. Hope, the Scientific Officer, in reviewing the work of the Scientific Department during the year said that a good deal of attention had been devoted by the Mycologist to Root Diseases of Tea. Dr. Hope remarked. "It is of great practical importance that the life histories of the different fungi which cause root disease shall be studied because the success of preventive and curative treatment is dependent on an understanding how the different fungi enter the tissues of the bushes. For instance, infection from bush to bush is conveyed in the case of some root fungi by fungal mycelia which grow in the soil; in other cases by means of spores which are produced above ground and are scattered by wind and settle on exposed tissue of other bushes. In the former case a deep trench is usually an effective check on the spreading of the fungus; in the latter case it is obviously not so, and other mean of prevention have to be devised."

A great deal of damage is caused by root diseases to Tea in Southern India, especially in new clearings. Recently an apparently new root fungus has appeared in the Nilgiris which is a bright scarlet colour on the attacked root when wet. Mr. MacRae, the Government Mycologist, was good enough to look at this disease when he was in the district with me in October and he traced it in direct connection with the roots of *Simplocos spicata* (*Boothagani.*) which tree has long been known to produce, or induce, root disease of Tea. He is studying this fungus in his laboratory, but he is a busy man with many other things to do and these root diseases of Tea are one of the many problems for which we need our own Mycologist. It is to be hoped that before very long we shall, despite the War, get the man promised to us by the Government of Madras under the new scheme of reorganisation of our Scientific Department.

In connection with root diseases Dr. Hope drew attention to "the general ignorance which prevails of the root growth of Tea bushes in particular types of soil." He and the Mycologist are attempting to correlate root growth and soil characteristics and "in making enquiries from planters as to the type of root growth prevalent on Tea gardens in different districts they noticed that very often lack of knowledge, and even lack of interest, was shown in the behaviour of roots." A pamphlet is promised shortly on roots in general and Tea roots in particular which should prove of the very greatest interest to all Tea planters.

An investigation into the factors which influence the quality of Tea is being undertaken, and in this connection Dr. Hope pointed out the information which will be of practical use in inproving quality either in the garden or in the factory can be acquired only very slowly and in periods which must be measured not by months but by years, or even by decades. "The difficutly which has to be faced is that the state of general chemical knowledge is such that there exists at present no satisfactory chemical basis from which all the factors which bear on quality can be approached, and until that has been worked out it is impossible to make satisfactory investigations of the changes which take place during the growth and manufacture of the leaf. It is unfortunate that there has been in the past a tendency to draw far reaching conclusions in regard to the influence of different garden and factory operations on quality, from what have been quite inadequate data."

Hybrid Coffee in Ceylon.

The Bulletin of the Imperial Institute (*XIII*, *3*) contains a report on a sample of Hybrid Coffee received from Ceylon the berry from a cross between *arabica* and *liberica* grown at the Peradeniya Experiment Station. In this respect it is like our South Indian Hybrids which are all crosses between these two species of Coffee. A chemical analysis of the beans, which were somewhat irregular in shape and varied in size from medium to small, showed that they contained more caffein than the average; 1·7 per cent as compared with 1 to 1·5 per cent, the normal amount in ordinary coffee. The percentages of crude fibre and fat were exceptionally low. The coffee was valued at 43 per cwt. in comparison with Java robusta at 46 to 49 in January 1915, and it was said to be insufficiently washed.

RUDOLPH D. ANSTEAD,
Planting Expert.

RUBBER TRADE ASSOCIATION OF LONDON.

MONTHLY STATISTICS,

No. 7.

IMPORTS of all kinds of Rubber into the United Kingdom.

From	October. 1915.	October. 1914.*	October. 1913.*	Ten Months ended October. 1915.	Ten Months ended October. 1914.*	Ten Months ended October. 1913.*
Straits Settlements and Federated Malay States ...	3,912	2,355	2,411	36,079	23,989	20,538
Ceylon ...	991	748	930	11,016	6,715	5,385
British India ...	93	—	—	1,112	—	—
Dutch East Indies ...	236	—	—	2,262	—	—
Brazil and Peru ...	1,407	1,099	1,262	11,528	11,625	14,889
Africa ...	363	12	64	2,970	474	1,565
Other Countries ...	123	1,005	1,481	1,575	11,858	16,038
Total Tons...	7,125	5,219	6,148	66,542	54,661	58,415

EXPORTS of all kinds of Rubber from the United Kingdom.

To	October. 1915.	October. 1914.*	October. 1913.*	Ten Months ended Oct. 1915.	Ten Months ended Oct. 1914.*	Ten Months ended Oct. 1913.*
Russia ...	582	2,100	423	8,594	6,396	5,182
Germany ...	—	—	724	—	7,072	8,383
Belgium ...	—	16	336	—	1,476	1,851
France ...	601	114	637	5,734	4,502	4,179
United States ...	2,312	3,872	1,453	32,636	21,129	14,251
Other Countries ...	480	167	326	6,700	2,996	2,995
Total Tons...	3,975	6,269	3,899	53,664	43,571	36,841

*Including Waste and Reclaimed Rubber.

IMPORTS, DELIVERIES AND STOCKS in London and Liverpool, October, 1915.

		Imports. For Oct.	Deliveries. For Oct.	Stocks 31st Oct. 1915.	Stocks 31st Oct. 1914.	Stocks 31st Oct. 1913.
London	Plantation ...	5,552	4,643	6,154	3,194	3,609
	Other kinds ...	76	280	189	889	858
	Total Tons...	5,628	4,923	6,343	4,083	4,467
Liverpool	Para ...	1,162	1,194	550	343	597
	Other kinds ...	273	212	412	539	1,390
	Total Tons...	1,435	1,406	962	882	1,987
Total Tons for London & Liverpool...		7,063	6,329	7,305	4,965	6,454

SHIPMENTS FROM STRAITS SETTLEMENTS AND F. M. S.

	September.			Nine Months ended Sept.		
	1915.	1914.	1913.	1915.	1914.	1913.
Tons ...	8,059	4,481	3,057	54,960	34,567	24,930

SHIPMENTS FROM CEYLON.

To	*September.	Nine Months ended September. 1915.	1914.	1913	1912.
United Kingdom ...	770				
Russia ...	—				
Germany ...	—				
Belgium ...	—				
France ...	55	14,016	11,023	7,881	4,035
U. S. A. ...	1,120				
Other Countries ...	14				
Total Tons...	1,959				

*Figures made up to September 27th.

U. S. A. IMPORTS AND EXPORTS.

	August.			Eight Months ended August.		
IMPORTS.	1915.	1914.	1913.	1915.	1914.	1913.
India rubber ...	7,616	2,971	3,949	62,833	41,193	34,333
Gutta and Balata ...	1,358	733	2,127	8,341	8,027	16,237
Total Tons...	8,974	3,704	6,076	71,174	49,220	50,570
EXPORTS.						
India rubber ...	110	204	95	1,466	1,360	1,450
Gutta and Balata ...	24	—	19	367	49	58
Total Tons...	134	204	114	1,833	1,409	1,508

PARA RECEIPTS.

	Oct., 1915.	July-Sept., 1915.	Total.
Rubber ...	2,435	5,075	7,510
Caucho ...	180	1,070	1,250
	Oct., 1914.	July-Sept., 1914.	Total.
Rubber ...	2,695	4,508	7,203
Caucho ...	310	912	1,222

6, MINCING LANE, E. C.,
22nd November, 1915.

COFFEE.

Tropical Industries.

Coffee and Coffee Rust in Java.

In Doctor Copeland's report on a visit to Java, published in the "Philipine Agriculturist and Forester" (April 1915), he discusses the subject of disease, and, he states in the following extract from his report. It would appear that a new species of pest of known parentage has appeared which has characters specifically different from those of the parent coffee rust in Ceylon. The extract referred to was republished in the "Agricultural News," Barbados, of 28th August, and reads as follows :—

"The coffee rust attacked Java several years before it reached the Philipines, and absolutely nothing but difference in the two Governments is responsible for the fact that Java has still an exceedingly important and profitable coffee industry, while that of the Philipines has been dead for the past twenty-five years. The Japanese Government met the coffee rust promptly with a fight by means of fungicides, by selection of the most resistant plants to be found locally and by the importation of every other kind of coffee which could be found in the world. The result is that the various species of coffee which are now being experimented with at Los Banos, and in almost every other similar institution in the tropics, have all been to our attention by the Government of the Dutch Indies. The first of these to show great promise was Liberian coffee. This was widely heralded as a rust-resisting species, and was extensively planted in Java, and to lesser extent in many other parts of the Old World tropics.

"It developed after a time that the quantity of the marketed Liberian coffee was such that it could only be raised with a profit where labour is exceedingly cheap, and that even here it was at a serious economic disadvantage. The Dutch Government met this difficulty by a careful study—of methods of preparation, with the ultimate result rather recently obtained and for which, although I have myself made a considerable study of the subject, I was absolutely unprepared, that the Liberian coffee produced in Java is now being marketed at price above that of the Arabian coffee for which Java itself is so famous.

"A wholly new and unexpected difficulty then presented itself. The Liberian coffee began to be attacked by rust, and these attacks increased in virulence year by year, until the rust of Java now attacks Liberian coffee with approximately the same violence as Arabian. This is at the same time a matter of prodigious practical importance and a fact of the utmost scientific interest. Neither the coffee nor the coffee rust is native in Java. It is practically impossible that the rust which now attacks the Liberian coffee should be anything else than a descendant of the rust which was formerly able to attack Arabian coffee but not Liberian. In other words, the pest has in the course of a number of years developed wholly new properties. Uninfected Liberian coffee has been exported from Java and raised elsewhere and found immune to the rust of the other regions. At the same time new importations of Liberian coffee, immune to rust in the places of origin, have been brought into Java and promptly attacked. Now, the ability to live on a particular host is in very many cases regarded as a good specific character of a fungus. It can accordingly be regarded a definitely established that there has been developed in Java during the last twenty-five years a fungus of known parentage, but which now has characters specifically different from those of the parent coffee rust of Ceylon. This the most satisfactory case known to me in the whole realm of science, of the evolution of a new species from a known parent within a definitely known length of time, and under conditions which are a matter of satisfactory record."—*Queensland Agricultural Journal.*

TEA.

EXPORTS OF INDIAN TEA FROM CALCUTTA, CHITTAGONG AND SOUTH INDIAN PORTS.

	1915. lbs.	1914 lbs.	1913. lbs.
Sailings to Great Britain from Calcutta in November Black 15,917,465 Green Nil	15,917,465	41,812,312	17,652,763
Sailings to Great Britain from Chittagong in November Black 6,207,503 Green Nil	6,207,503	14,273,774	7,541,445
Sailings to Great Britain from 1st April 1915 to 30th November 1915 (including Chittagong) ...	164,617,031	173,206,159	156,245,497
Sailings to Australia and New Zealand in November ...	813,362	1,818,206	882,275
Sailings to Australia and New Zealand from 1st April 1915 to 30th November 1915 ...	6,820,320	7,533,498	6,711,604
Sailings to North America in November Black 2,293,590 Green 21,698	2,315,288	2,724,755	2,189,446
Sailings to North America from 1st April 1915 to 30th November 1915 ...	8,590,568	6,681,811	6,315,781
Sailings to other places in November (see reverse) Black 5,687,731 Green Nil	5,687,731	2,572,599	9,173,021
Sailings to other places from 1st April 1915 to 30th November 1915 ...	28,463,781	14,338,125	37,654,698

The following are the Shipments from Southern Indian Ports during the month of November, 1915, *viz*:—

Cochin—		
To London	742,294 lbs.	
„ Asiatic Ports	450 „	
		742,744 lbs.
Tuticorin (direct)—		
To London	605,089 „	
„ Colombo	34,890 „	
„ Bombay	31,090 „	
		671,069 „
Tuticorin (*via* Colombo)—		Nil.
Quilon—		Nil.
Alleppey—		Nil.

Calicut—			
To London	1,372,514 lbs.		
Bombay	13,382 ,,		
Broach	864 ,,		
			1,386,760 lbs.
Do from 1st April, 1915.	2,800,573	2,384,746	1,900,655
To 30th November, 1915 ...	15,778,741	13,139,649	12,698,226
Total Sailings from 1st April, 1915 to 30th November, 1915 ...	224,279,441	214,899,242	219,625,806
Daily Customs Entries for Export from Calcutta to Great Britain from 1st April, 1915 to 30th November, 1915			
Black 129,942,402			
Green 6,567			
		129,948,969	
Do from Chittagong 1915			
Black 41,702,223			
Green Nil.			
		41.702,223	
			171,651,192
Do from Calcutta 1914			
Black 145,052,639			
Green Nil.			
		145,052,639	
Do from Chittagong 1914			
Black 39,132,050			
Green 58,936			
		39,190,986	
			184,243,625
Exports from Calcutta to Bombay by rail from 1st April, 1915 to 30th November, 1915			12,177,368

*Exports of Tea from Ceylon as per Ceylon Chamber of Commerce Price Current Figures.

Total Exports from 1st January to 20th December 1915	...	...	Black	194,081,848	lbs.
Do do	...	...	Green	4,752,906	,,
Do do 1914	...	...	Black	175,661,374	,,
Do do	...	...	Green	4,195,554	,,
Do do 1913	...	...	Black	176,915,345	,,
Do do	...	...	Green	4,883,042	,,
Do do 1912	...	...	Black	173,796,650	,,
Do do	...	...	Green	7,434,517	,,

*These figures are obtained from manifests completed up to 20th December 1915, incomplete manifests prior to that date are not included.

STATEMENT SHOWING THE DESTINATION OF EXPORTS OF TEA TO SUNDRY PORTS DURING THE MONTH OF NOVEMBER, 1915.

	lbs.		
Aden	... 18,553		
Africa East Protectorate ...	... 13,500		
Do Portuguese East ...	... 1,040		
Do Italian East ...	... 3,230		
Cape Colony	... 83,581		
Ceylon	... 50		
Chile	... 333,920		
China :—			
Hankow	...1,368,996		
Other Ports... ...	... 30,113		
Egypt	... 111,619		
France	... 11,110		
Hongkong	... 22,326		
Madagascar	... 1,360		
Natal	... 28,339		
Peru	... 8,000		
Russia Northern :—			
Petrograd	... 5,750		
Russia Pacific Ports :—			
Vladivostock ...	... 254,757		
Tchelianbinsk ...	...1,475,141		
Russia Southern :—			
Moscow	...1,778,909		
Somaliland (British) ...	... 1,650		
Straits Settlements ...	... 51,160		
Siam	... 1,050		
Zanzibar & Pemba ...	... 5,700		
		5,609,854	lbs.
Rangoon	... 62,607		
Other Indian Ports ...	... 15,270		
		77,877	,,
	*Total...	5,687,731	,,

STATEMENT SHOWING SHIPMENTS OF TEA FROM CALCUTTA AND CHITTAGONG UNDER OPTIONAL BILLS OF LADING DURING THE MONTH OF NOVEMBER 1915.

—	London and/or other ports in the United Kingdom.	London and/or America and/or Continent.	Constantinople and/or other ports in Asia.	New York and Boston and/or other ports in America.
	lbs.	lbs.	lbs.	lbs.
Calcutta ...	Nil.	Nil.	Nil.	18,020
Chittagong ...	Nil.	Nil.	Nil.	Nil.

*The above figures are included in the exports shown on the front page.—*Indian Tea Aassociation*, Circular No. 64, dated Calcutta, 30th December, 1915.

AGRICULTURE.

Madras, 1915.

The Madras Administration Report for 1914-15 as usual contains much that is of interest to our readers. In the General Summary it is stated that, "the well-being of the Indian peoples is largely determined by the nature of the season and in the year now under review that was not altogether favourable. The rainfall was ill-distributed and somewhat untimely and there were serious floods in the Kistna and Tinnevelly Districts. But in 1914—15 the effect of the war was perhaps even more potent than that of the season. It is seen chiefly in the figures for sea-borne trade. The foreign imports from August 1914 to March 1915 were 37 per cent less than those in the same period of the previous year, while the exports declined by 34 per cent. The industrial development noted in recent years also received a check. The large weaving and spinning factories employed fewer hands, and the expansion of the rice-hulling, cotton-ginning, and pumping industries was less rapid. The co-operative credit movement was hampered by the difficulty in recovering outstandings. Progress in Municipal sanitation was delayed owing to the non-receipt of stores from England. Even agriculture was affected, for the enemy countries were in normal times large buyers of the three chief commercial products—cotton, groundnuts, and cocoanuts—and the dislocation in the prices of these commodities deprived the agricultural classes of a considerable income. The Government revenue naturally suffered. The floods already mentioned led to increased remissions of land revenue. The decrease in imports resulted in a reduced customs revenue. There was diminished business activity and the revenue from stamps and registration fell in consequence. The earning of railways declined considerably. The receipts of the Forest Department were less as there was a smaller demand for certain kinds of forest produce, while the normal growth of excise revenue exhibited every year was arrested by the general shrinkage of incomes. On the other hand expenditure increased owing to larger outlay on repairs to irrigation works, the recall of officers on leave, the opening of additional courts of law, and the employment of additional establishments in them. The total result was that the provincial expenditure of the year exceeded the provincial revenue by Rs.65½ lakhs. On the whole, however, the Presidency came through a difficult year satisfactorily. The attitude of the people has generally been excellent. There was little unwarranted excitement and the prices of the staple food grains did not rise."

Under the heading of Agriculture it is stated that, "the year has been one of undoubted progress both in the district and at the College. The most notable events were the admission of twice the usual number of students to the Agricultural College as a result of the introduction of the revised course of studies, the holding of an Agricultural and Trade Conference in Madras in December 1914, and the receipt of the Secretary of State's sanction for the reorganisation of the Agricultural Department. This last provides for seven Deputy Director's divisions in the Presidency, more agricultural stations, a trained district staff in every district, the co-ordination of the prospects of assistants in the scientific sections at the College with those of the members of the executive staff, and a general improvement in the pay and prospects of most of the subordinate members of the service. All the ten agricultural stations were at work, and in the districts the activities of the department were chiefly directed towards the establishment on a much larger area than in the previous year of better strains of cotton, especially in the Tinnevelly

district, the reduction in the rate of seed used for paddy transplantation, the extension of the practice of green-manuring paddy lands, the use of phosphatic fertilisers for paddy, the spread of better varieties of sugar cane, the use of improved mills for crushing the canes, and the combating of certain diseases, chiefly those affecting the palmyras in Kistna and Godavari, and the cocoanut palms in Malabar. The campaign against the last mentioned disease was practically brought to a close. At the farms and in the laboratories, enquiries were continued to elucidate the manurial requirements of paddy soils, the inheritance of characteristics in paddy and cotton, the life histories of several fungi and insects, the comparative values of very many different crops, and the effect of different fertilisers. The soil survey of the delta portion of the Guntur district was also completed during the year under report. Five co-operative Agricultural Associations were formed for the joint purchase of manure, etc. which is an advance upon the number recorded for the previous year. The work on sugar cane breeding continued and the analysis of the Madras seedlings compared favourably in respect to sucrose contents with some of the best varieties of imported canes."

"The total rainfall during the south-west monsoon was above the average in the majority of districts. The north-east monsoon rains were insufficient in some districts. The area under cultivation exceeded the normal extent by 2'76 per cent. The areas under paddy, gingelly, ground-nut, and tobacco showed an increase, while those under cholum, cumbu, ragi, castor, sugarcane, cotton, and indigo decreased. The outturn of crops was below the normal except in the case of paddy in Coimbatore and the Nilgiris."

At the Government Cinchona Plantations, "the season was favourable and the young plants prospered. There was a reduction in the area under cultivation, as the area uprooted and abandoned exceeded that newly cultivated. The bark crop for the year was somewhat less than that for 1913—14 owing to the smaller areas uprooted. Local purchases also decreased, while no Java bark was bought. On the other hand the quantity of bark worked up and the amount of quinine sulphate obtained were larger than in previous years and there was an improvement in the percentage of quinine sulphate extracted from the bark. The cost of manufacture was reduced by improvements in the manufacturing process and by the higher quinine content of the locally purchased bark. The stock of quinine sulphate at the end of the year was considerably reduced but the stock of bark slightly increased. The issues from the factory and the sales at post offices were larger than those of the previous year. The plantations and factory continue to be worked at a profit to the Government.

The trade report is as follows :—"The total value of the seaborne trade of the Presidency was nearly Rs. 4,868 lakhs, showing a decline of Rs. 948 lakhs, or more than 16 per cent. as compared with the total trade of the previous year. The war with Germany and Austria which broke out in August 1914 stopped the considerable trade with those countries. There was further a complete stoppage of trade with Belgium and a large diminution of that with France. Since November trade with Turkey also ceased. Moreover exports to allied and neutral countries also suffered, due in the case of the former to smaller demand, and in the latter to the restrictions which it was found necessary to place on the export of certain articles, either on account of direct military requirements, or the necessity of preventing supplies reaching the enemy. There was also a serious shortage in tonnage arising in part from the taking up of vessels for military

transport purposes and in part from the increased demand elsewhere. Freight rates were in consequence higher and in addition war risks had to be paid. The net result is, that foreign trade declined by Rs. 848 lakhs or 19 per cent. and coasting trade by Rs. 100 lakhs or 7 per cent. Under foreign trade imports fell by Rs. 390·32 lakhs or 23 per cent. and exports by Rs. 457·91 lakhs or 17 per cent. The decrease in imports was due to smaller receipts of cotton manufactures, metals, cotton twist and yarn, machinery, railway materials, glass and glassware, hardware, gold and silver thread, spices, dyeing material, motor vehicles, and sugar. The total value of imports of cotton goods representing 34 per cent. of the total foreign imports declined by Rs.171·97 lakhs or 29 per cent. There were large stocks at the beginning of the year and the imports during the first four months of the year up to the outbreak of the war exceeded those of the corresponding period of 1913-14. There was practically no buying after the end of July and the deliveries from stocks were much reduced but the orders of the old contracts continued to arrive till October when there was a big drop. The outbreak of war also considerably affected the imports of metals which fell by Rs 79·26 lakhs or 40 per cent. Iron and steel declined by 47 per cent and copper by 24 per cent. Imports of machinery had a set back by Rs. 21·14 lakhs or 28 per cent, and those of railway materials by Rs. 19·62 lakhs or 16 per cent. The stoppage of trade with Germany and Austro-Hungary curtailed the imports of dyes and glassware by 52 and 61 per cent respectively, Germany being the chief source of supplies of dyes.

"Exports of country produce declined by Rs. 424·27 lakhs or 17 per cent and those of foreign merchandise by Rs. 5·47 lakhs or 27 per cent. The decline in the former case was due to smaller shipments of seeds, raw cotton and tanned skins and raw jute, partly counterbalanced by larger shipments of tanned hides, grain and pulse and rubber. The increase in the case of exports of rubber by Rs. 11·67 lakhs was owing to the larger number of rubber trees coming into bearing."

CORRESPONDENCE.

33rd Cavalry,
I. E. F. "D,"
Bombay.

S. I. P. War Fund.

THE SECRETARY,
United Planters' Association of S. India,
25, South Parade,
Bangalore.

Dear Sir,—I have to acknowledge with many many thanks your letter of 9th November, enclosing a copy of Mr. Murphy's speech and the resolution passed at the last annual meeting of your Association.

There are many planters out here, both from Ceylon and India and I can assure you we all are very grateful and appreciate to the fullest the Planters' War Fund organized by the above Association. We are all very proud of being Planters and stick to one another like glue. We are proud of our pals and men of mark who had to stay behind and whom we knew would give anything to be at the Front.

We have had some very heavy fighting, recently and our losses were heavy at the battle of Ctesiphon and many familiar faces are absent but one lives in hopes of seeing them turn up some day.

Your sincerely,
A. H. W. SHELDRICK.

The Planters' Chronicle.

RECOGNISED AS THE OFFICIAL ORGAN OF THE U. P. A. S. I., INCORPORATED.

(Secretary's Registered Telegraphic Address "Planting," Bangalore.)

VOL. XI. No. 4.] JANUARY 22, 1916. [PRICE AS. 8.

THE U. P. A. S. I.

(INCORPORATED.)

It is with very sincere and deep regret that we have to chronicle the sad death of a very dear old friend in Mr. H. G. Bonner, Markul Estate, from a motor accident. He was one of the most successful planters in Mysore and one of the most esteemed and respected by both old and young comrades. Of the former but few remain and the Editor, whose friend Mr. Bonner had been for over thirty years, knows he but voices the deep regret of his old friends at his untimely death and knows that the young ones cannot follow a better example in manly uprightness, than our dead friend's whole life exemplified. A sound planter and cherished friend has been suddenly taken from our midst and many an eye will moisten when we look round where planters congregate for work or play and many a one will murmur "Oh for the touch of a vanished hand and the sound of a voice that is still."

SOUTH INDIA PLANTERS' WAR FUND.

	Rs.	A.	P.
Amount previously subscribed	33,676	8	0
Mr. G. E. Bewley	10	0	0
,, R. Lescher	25	0	0
,, H. Clifton Leslie	10	0	0
Kotada Estate	10	0	0
Mr. C. E. Abbott	50	0	0
,, E. C. Walker	15	0	0
,, W. H. G. Leahy	20	0	0
,, J. S. Wilkie	30	0	0
,, J. M. Wilkie	20	0	0
,, C. A. Mackenzie	45	0	0
,, E. D. Atkins	20	0	0
Total Rs...	33,931	8	0

OVERSEAS AIR CRAFT FUND.

Amount previously subscribed	4,308	14	0
Mr. A. G. Nicholson	150	0	0
Total Rs...	4,458	14	0

SCIENTIFIC DEPARTMENT, U. P. A. S. I.

Green Bug in Java.

The Review of Applied Entomology (III. 11. p. 646.) contains a digest of a paper by Keuchenius on some Scale Insects injurious to Coffee in Java. Among the scales which attack the Coffee there the following are familiar to us in South India:—*Lecanium viride*, Green Bug; *Lecanium hemisphærrica*, Brown Bug; *Pulvinaria psidii*, the Mealy Bug.

A good deal is said about the Green Bug which appears to be an important pest on the Coffee in Java as it is with us, and though the author of the paper has nothing that is new to say it is of interest to note some of his remarks. This scale was first noticed in Java at the end of the last century on Liberian coffee. A careful study of the rate of movement of the very young larvae in search of a place to which to attach themselves gave a mean speed of one metre (3'28 feet.) in 45 minutes, which is sufficient to be a very important factor in the spread of the pest. The resting place preferred is the under side of the leaf and on, or close to, the central vein, almost invariably with the head turned towards the base of the leaf. The insect probably remains in the same place during its whole life, provided the leaf remains alive. The quantity of sweet exudation produced is greater than in most other Scale Insects, which increases their attractiveness for ants. In Java reproduction goes on all the year round and may begin when the insect is six weeks old. Zehntner's calculation of the rate of reproduction of *Chionapsis saccharifolia*, is regarded as applicable to *Lecanium viride i.e.*, that one female in October may have nearly 20½ millio: s o: descendants by the middle of the following April. In this part of Java there is evidence that the Green Bug will live and thrive fairly well at an elevation of 5000 feet above sea level, though under these conditions, it is hardly a pest. It is most in evidence at the end of the dry and the beginning of the wet season, and this unfortunately coincides with the time of most active growth of the Coffee plant. The rainy season is unfavourable to the pest; the heavy tropical rains wash away many of the young larvae and a white fungus attacks them and destroys large numbers. The physical condition of the plant has a great influence on the pest, and if it is weak, the scales do not reach their normal development. When the attack is serious the growth of the plant is arrested, the flowers are scanty, and the fruit sets badly, and if attacked by the scale aborts and falls off. It is generally believed that the direct cause of these injuries is the incessant sucking of the plant juices but the author thinks that the injection of harmful secretion into the plant also occurs. The fungus is the most important enemy of this scale and during the west monsoon enormous numbers are destroyed by it.

The planters' remedy against the scale is to lime wash the plants which is considered a good method if thoroughly well done, but conditions make this difficult. Cyanide fumigation has been tried successfully, but is too costly and lengthy a process. The maintenance of vigorous growth in the plant is a most important means of protection. Major found that manuring the plants with a mixture of kainit and lime freed them from scale.

RUDOLPH D. ANSTEAD,
Planting Expert.

DISTRICT PLANTERS' ASSOCIATIONS.

Anamalai Planters' Association.

Minutes of a Committee Meeting of the Anamalai Planters' Association, held at the Club, on the 23rd December, 1915.

PRESENT.—J. Hatton Robinson, E. W. Simcock, J. E. Scott, R. Fowke, G. A. Marsh, R. Moxon, C. R. T. Congreve (Chairman), A. C. Cotton (Honorary Secretary).

WESTERN OUTLET.—The deputation which went to Trichur to consult with the Dewan had a satisfactory meeting on 19/11/15 and the Dewan agreed to send an outline of his scheme to the Association at an early date.

MEDICAL.—Read District Board Order No. 1259 of 15 and recorded same.

The Honorary Secretary was asked to write to the Chief Engineer, Superintending Engineer and Collector requesting that steps might be taken to hurry on the construction of the Hospital which seemed no nearer completion than it did 6 months ago, and asking when the necessary quarters for Assistant Surgeon, etc. would be built.

PEST ACT.—Read and recorded letter from Secretary, U. P. A. S. I., and draft of pest act.

MINOR FOREST PRODUCE.—Honorary Secretary was asked to write to the Secretary, requesting him to furnish Accounts and Balance Sheet to end of January 1916 at the Annual General Meeting of the Association, to be held in February to enable the exact financial position to be ascertained.

LOCAL LABOUR RULES.—The Honorary Secretary was requested to write and ask the Deputy Director, U. P. A. S. I., Labour Department, to try and obtain copies of district rules in force in other districts, to enable this district to draft suitable local rules.

RUBBER GROWERS' ASSOCIATION.—Mr. Behr was unanimously chosen to represent this district.

DISTRICT MAGISTRATE.—Read and recorded District Magistrate's letter, R. O. C. No, 1433 of 1915.

The Honorary Secretary was requested to write and thank the Collector and to point out that one visit every 2 months was insufficient for the needs of this district, and to ask that a permanent Magistrate may be appointed, and that suitable quarters for housing him may be built as soon as possible.

GHAT ROAD.—The Honorary Secretary was requested to write to the Superintending Engineer and Executive Engineer pointing out the disgraceful condition of the ghat road and the dangerous state that many of the bridges are in, and to ask how the present grant for this road compares with the grant 6 years ago.

POST OFFICE.—The Honorary Secretary was asked to write to the Superintendent of Post Offices, complaining of the great delay in the delivery of the parcels, pointing out that parcels frequently took 8 to 10 days to come from Madras. Also to point out that as the work in the post office has increased so much in the last 2 years, one Post-master was unable to cope with it and to request that an assistant be sanctioned at an early date.

The Honorary Secretary was also requested to write to the Post Master General, asking what steps were being taken to build the combined Post and Telegraph Office on the Township site, as if this very necessary office was not built soon, the monsoon would be starting and work be impossible.

(Signed) C. R. T. CONGREVE,
Chairman.

EXHIBITION.

Report on the Exhibition of Planters' Products at People's Park Fair, Madras, Christmas 1915.

Mr. Keell of Messrs. Keell & Waldock, Colombo, very kindly came over at his own expense to judge the Planters' Exhibits of Tea, Coffee, Rubber and Cardamoms. The Judging Sub-Committee appointed by the General Committee accepted his opinion entirely in these matters and expressed their great indebtedness to him to his expert assistance and for the quick and generous manner, in which he responded to a request to come and judge. He came at considerable trouble, as being a Volunteer he had to obtain permission of the Military Authorities to leave the Island and he gave up the whole of his Christmas to this voluntary task of judging. The Judging Sub-Committee appreciated his help enormously as there was no one in Madras so competent to express an opinion on these exhibits. His report is as follows:—

"*Tea.*—Having examined samples of tea and judging *by the appearance of the leaf only* as I had no means of tasting the different samples, I would place the Estates in the following order of merit:

1. Erramaculla.
2. Daverashola.
3. Glenmary.
4. Kaduakarnam.
5. Rob Roy.
6. Vembenaard.
7. Indian Peninsular.
8. Perindotty.
9. Prospect.
10. Munnar.
11. Thia Shola
12. Seaforth.
13. Bonami.
14. Surianalle.
15. Chokanad.
16. Karamalli.
17. Kanniamallai.
18. Ambanad.
19. Lockhart.
20. Stagbrook.
21. Venture.
22. Haileyburia.
23. Ashley.

I think that some of the exhibits shown are "Exhibition Samples" and I have judged on that. Some Estates have however put in commercial samples. I cannot entirely differentiate in every case which is a commercial exhibit and which have been prepared for the exhibition. But of those which are obviously commercial samples I would especially mention

Munnar,
Thia Shola,
Surianalle,
Kanniamallai,

in this order."

Mr. Keell suggested that if any similar competition be organised in future

(*a*.) The Wynaad and Nilgiri teas should be put in one class for competition and those of the Anamalais and the South in another.

(*b*.) That it be made clear that commercial samples are needed *i.e.*, drawn fairly either from the last or next consignment from the Estate.

(*c*.) That proper "tasters" be supplied. He thought some of the "golden tip" exhibits were exceptionally good.

Coffee.—Mr. Keell judged as follows:—

"Coffee in Parchment"	...	Messrs. Peirce Leslie & Co.
Cured Coffee	...	Messrs. Matheson & Co., Coorg.

Rubber.—Mr. Keell wrote as follows:—

"Many of the Exhibits here were very good, especially the smoked sheet. With the market, as it is at present, most at the top would get the same price but taking as a criterion which samples would hold their position best on a weak market, I select the following in the order shown:

Smoked sheet.—1. Kerala.
2. Mooply Valley—Palapilly Estate.
3. Pudukaad.

Lace Crepe.—Kadamankulam.

Thicker Crepe.—Boyce Estate.

Cardamoms.—

Green	...	Gudumapara—Malabar.
Cured	...	Anglo-American Co., Valparai Estate, The Anamalais."

Such is Mr. Keell's report. He gave me to understand that probably in case of another representative exhibition, he would be ready to come again and judge, but he would very much like then to have a chance of meeting and talking to planters about the exhibits, as undoubtedly some of the tea was over-fired and some of the rubber sheet badly handled.

The General Committee decides how many certificates of merit will be given. His Excellency the Governor will announce these awards on Saturday, January 15th.

I would like to express my thanks to the Planting Community for making such a good show and I trust that Mr. Keell's report will be of interest to them, and hope that this will not be the last exhibition of planters products in our Presidency.

(Signed) D. T. CHADWICK.

Madras, 12th January, 1916.

Banana Ash.

A sample of banana ash was recently forwarded to Mr. J. C. Brünnich, Agricultural Chemist, for an estimate of its potash contents. This sample has been analysed with following result:—

"The sample of crude banana ash submitted, contained in percentage:—

Potash	...	...	16·6
Lime	...	...	5·0
Phosphoric acid	...	...	1·4
Insoluble, chiefly carbon	...	...	34·7

This ash would be worth, at the present time, about £8 per ton. The yeild is very small (about 1 per cent), which agrees with our previous analyses; and the commercial utilisation of the banana stalks for production of potash manure is out of question. At the same time, it shows the importance of allowing the stalks to rot in the fields to return their mineral constituents to the soil."—*Queensland Agricultural Journal.*

SCIENCE AND CIVILISATION.

The San Francisco meeting has been appointed with the double purpose of encouraging the development of science in the Pacific region and of uniting with other organisations in celebrating the completion of the Panama Canal. There could scarcely be a better illustration of the relations of science to civilisation than the canal supplies. This great waterway has been constructed, not so much by the potency of our national wealth in gold, not so much by the wonderful engineering and administrative ability which we all delight to honour, as by the victory of pure and applied science over the sources of malarial and yellow fever infection. Three centuries of research in the various branches of biology, as pure sciences, inaugurated by Vesalius's anatomical dissections (about 1530), by Harvey's discovery of the circulation of blood (about 1616) by Hooker's introduction of the microscope (about 1665), by Leeuwenhoek's discovery of protozoa (1675), and indeed of bacteria (1687), and continued by a succession of unselfish men whose names are as household words to all biologists, had led up naturally to the mighty contributions of Pasteur, Lister, and Koch in bacteriology. Then followed, logically, the investigations of Reed and others upon yellow fever infection, and of Laveran, Manson, and Ross upon malarial infection. Except for such voluntary tests as were made at the peril of their lives by Drs. Lazear and Carroll in Cuba in the year 1900, in which Lazear paid the extreme penalty of death from yellow fever, and for the tests made by many other volunteers, especially in Italy, as to malaria, in order to determine the precise conditions under which certain mosquitoes transmit these diseases, the canal would not be complete to-day. Our Government might not, in fact, have started upon its construction; or, if the Government had started blindly to lead the blind, there would have been failure as miserable as that recorded by the French canal company, and for the same reason. We forget unpleasant facts quickly; for example: that of thirty-six brave French nurses who came together to the canal zone only twelve returned to France; that out of eighteen ambitious young French engineers who crossed the Atlantic on the same ship for service on the canal, only one was alive at the end of thirty days; and that the labourers died by the thoushands. The project of constructing the canal was surrendered to an unknown enemy. Let us assume, however, that such sacrifices had prevailed in their purpose, and that the canal had been completed in accordance with the engineering plans. With malaria and yellow fever still ruling in the canal zone, and with the zone as a centre of infection for all ports of the Atlantic and the Pacific, would a completed canal be a valued asset to commerce, or would it be a constant menace and a nuisance? Let Memphis and Havana and New Orleans answer. A grateful people could worthily erect by the Golden Gate a monument to Lazear, who gave all that he had to make the construction of the canal possible, and to make the completed canal of permanent value.

The minds of all thoughtful people are dwelling daily upon another great application of science—the European and world-wide war. During the past twelve months the resources of the leading European nations have been applied with the utmost intensity to purposes of destruction—to turning the hands of civilisation backward. The most recent discoveries in science and the latest inventions are utilised in dealing death to the foe, from the air, from the land, from the sea, and from under the sea. It is a fact that the efficiency of the engines of death in all nations is measured by the state of science in those nations. By way of comment upon this lamentable truth, what shall we who advocate the advancement of science say for the faith

that is in us? The prostitution of science to the killing and crippling of men is indeed an ugly fact but its results are negligible in comparison with the daily ministrations of science to the people's needs. A conflagration may burn a great city; but the inhabitants of that city do not ask that fire, the most useful servant of the human race, shall be banished from their daily lives. The remarkable advance in the civilisation of the leading nations during the past four centuries has been due, chiefly, to the daily and hourly influences of accurate knowledge and scientific method; and this advance has been made not by virtue of, but in spite of, wars and the implements of warfare. In this connection, let us note that the scientific spirit is all but unknown among the Turks, the Moroccans, the Mohammedans in general, the Hindus, the Egyptians, the Chinese. Amongst all these peoples, comprising three-fifths of the human race, can any one of us to-day recall the names of three men who have contributed appreciably to the advancement of science in the past two centuries? The very limited introduction of scientific method into their countries is the work of alien governors or alien influence. The unscientific nations are threatened with absorption by their more scientific neighbours, not so much because they do not invent or perfact the most powerful cannon, the sturdiest Dreadnought, the speediest aeroplane, or the subtlest submarine, as because the scientific peoples forge ahead of them in the arts of peace, in the modes of thought, in the affairs of daily life. The unscientific peoples are without influence in the world, not because they are unwarlike—the Turks and essentially all Mohammedans are warlike enough to suit the most exacting—but because they are lacking in the everyday effiency which accompanies the scientific spirit.

The term science may be defined in several ways. From the point of view which interests us to-day, we may say that science is the relationship of cause and effect. Wherever we observe an effect, there has been a cause; wherever causes are operating there will be effects. The same causes, acting under precisely the same conditions, will produce precisely the same effects. This is the experience of every investigator in every subject, and no one has the slightest reason to doubt the correctness of the principle. There is no room for the operation of the arbitary and the capricious; in fact, the arbitary and the capricious do not exist in nature. If in one case out of a hundred the result which interests us is different from what we had expected, we may rest assured that in this one case some change occurred in the forces acting; a new force entered, an old force became inoperative, or the relative intensities of the active forces changed. When we do not understand why certain events occurred it means that we do not understand the forces which acted to produce the events. The correct explanation of the events means that we have isolated the causes and have been able to express the laws of their action.—*Nature.*

(*To be Continued.*)

The goat as a source of milk is discussed in the *Board of Agriculture* (England) for October 1915. It is stated that there are two special qualities possessed by goats' milk which alone should make it popular: (1) the ease with which it is digested by children, and especially infants; (2) its almost complete immunity from germs of tuberculosis. It is stated that an average goat will give at its flush 3 pints a day.—*The Agricultural News.*

CORRESPONDENCE.

Yendayar Estate,
Mundakayam P. O.,
S. India,
7th January, 1916.

THE EDITOR,
Planters' Chronicle,
Bangalore.

Sir,—At Quilon Mr. Richardson said as reported in the *Planters' Chronicle*: "I have been attacked by the Mundakayam Delegate to the Bangalore Meeting for what he calls 'my most damaging remarks on rubber in South India.' At the Bangalore Meeting I certainly said our climatic conditions were not as favourable as Ceylon and the Straits." Mr. Richardson is not to be congratulated on his memory and I recommend him to verify his quotations in future. He did not at Bangalore refer to Ceylon and the Straits. He said: "The yield per acre is short of what we expected due entirely, I think, to our climatic conditions. Our low capital cost per acre, however, which I should say averages between £40 and £50 and a yield of 300 lbs. per acre at an F. O. B. cost of 8*d*. per lb. will show quite a good return to investors even at present prices." I did not describe this as Mr. Richardson's "most damaging remarks on rubber in S. India." I said: "The Chairman made the very damaging admission that the climate is to blame for our disappointing yields." I still consider this a damaging admission coming as it did from a U. P. A. Chairman who from his position might well be thought to know something of his subject. His full remarks on rubber in S. India I did not call damaging. I thought and still think them, if he will pardon my saying so, absurd. I said: "There cannot after all be much wrong if our mature rubber is as may be inferred from what Mr. Richardson said giving 300 lbs. per acre at the F. O. B. figures quoted by him." It is of course pure nonsense to talk about yield being short of what we expected if 300 lbs. per acre are being obtained. I doubt if Ceylon rubber averages more than this. At Quilon, however, Mr. Richardson did not talk as if 300 lbs. are now being obtained but said "if we can ultimately obtain a yield of 300 lbs. per acre." If yields are short owing, as Mr. Richardson told us at Bangalore, *entirely* to climatic conditions, I do not understand why he should think they will improve. Is it possible that he has thought of a plan, that is, a workable plan for altering the weather?

Personally, while I admit that yields from my own district—the only districts I feel competent to write of—though far from bad have not come up to expectations, I think, in fact I know that so far from climatic conditions being entirely to blame, the chief reasons for the shortage are the check given to growth by weeds having got out of hand, too close planting and too rapid excision of bark. One Estate in the district blessed with a Manager, wiser than most of us, commenced thinning out in good time, and from the first recognized the importance of using as little bark as possible. The consequence is that this Estate is now yielding very much better than any other estate in the district. I may add that my own 9 years old rubber, I have only one small field of this age, which has always been carefully tapped gave me approximately 243 lbs. per acre in 1915, and, though this is nothing to boast of (growth in early days was much retarded by weeds) is about the same as I obtained from most of my 11 years old fields—the best

gave 282 lbs. from which I most ignorantly for two or three seasons took off a great deal too much bark. It is rather like the old story of the Goose with the Golden Eggs. Only in this case the goose was rescued in time and after a spell of kind treatment will soon I hope lay extra eggs to show its gratitude.

Yours faithfully,
J. J. MURPHY.

Daverashola Estate,
Devarshola P. O.,
Nilgiris,
10th January, 1916.

Brown Blight of Tea.

THE EDITOR,
Planters' Chronicle,
Bangalore.

Dear Sir,—I have read with great interest Messrs. Anstead and McRae's article on *Brown Blight* of Tea—in the *Chronicle* of 1st instant. It was at my special request they paid a visit to this Estate to investigate the Blight on a 20 acre field where it had become very virulent. I have been a tea planter for close on 30 years and know most of the ordinary blights and diseases of tea and amongst them Brown Blight. I have noticed isolated cases of it here for many years and until 3 years ago never took much notice of it; but since then I have been giving it attention in many ways.

Why should it appear in this virulent form? Was it climatic? I think not. There were a number of cases of Brown Blight on this field during the season 1913-1914. It was pruned in January 1915 on red wood. Trees that had suffered from Brown Blight and which had been manured some months previously were collar pruned in May 1915. All prunings were carried off the fields and burnt in a swamp beneath. This might account for the distribution of the Blight. The field was originally heavily shaded with grevillas which I pollarded at about 12 ft. 3 years ago, and have kept lopped up since.

The appearance of the field to an observer is not pleasant—on about a 5 acre patch the trees are practically leafless, except for a small spurious new growth on top of branches—other parts give one the idea that a fire has run through the field. The new wood on all badly attacked trees is whippy and wiry and cannot be pruned into, thus necessitating going lower if pruning is done. The beginning of the end if the tree gets another attack after pruning.

The field has never been manured and is about 15 years old, and has given a yield averaging 700 to 800 lbs for a good many years now.

I have no wish to try and scare my brother planters. My only complaint against Messrs. McRae and Anstead is that they have not impressed sufficiently on the mind of the reader how virulent an attack of Brown Blight can be. I have never known any other Blight do as great damage. I have passed through a few thousand acres of tea since Messrs. McRae

and Anstead left me and seen Brown Blight everywhere. Am I going to be the only Job? As to trees scattered about the estate, some I left alone some I pruned low into white wood—others I collar pruned—liming and manuring all heavily at different times. The recovery of all these have been fairly successful, but the collar pruned trees which have come on I certainly think stand out from the others.

Manuring.—As Messrs. Anstead and McRae say, helps the tree to recover, but it will not cure the disease. The tree that wants more than manuring is the tree that has had an attack before pruning and gets it again afterwards. It wants to be safeguarded against the second attack. A collar pruned tree must be safeguarded against attacks. I am carrying out Messrs. McRae and Anstead's instructions here. I recognize the disease can do serious damage to tea.

My rainfall for the last 3 years is as follows:—

	1913.		1914		1915.	
	Wet dys.	Inches.	Wet dys.	Inches.	Wet dys.	Inches.
January ...	—	—	—	—	1	·20
February ...	—	—	—	—	1	·35
March ...	2	·48	1	·03	1	·38
April ...	5	1·80	3	·47	12	4·04
May ...	10	5·66	6	1·03	8	2·10
June ...	26	12·18	24	10·27	23	27·81
July ...	30	29·07	31	24·84	23	22·85
August ...	23	8·35	24	7·62	20	6·58
September ...	17	4·80	18	8·01	20	11·84
October ...	21	13·21	13	4·14	13	7·23
November ...	2	0·12	4	1·60	19	5·90
December ...	2	0·46	6	1·91	3	0·24
Total...	138	76·13	130	59·92	144	89·52

1914 was an abnormal dry year—the smallest rainfall recorded here. Our crop as will be seen is heavy during about 6 months of the year. Our average yield per acre about 750 lbs.

Elevation.—3,300 ft.

Jat.—Dark and light leaf Hybrid.

Yours faithfully,

J. S. NICOLLS.

Attention is drawn in the review to the fact that in spite of the general disturbance of business, the increased duty, the difficulties of transit, the imposition, removal, reimposition, and second removal of the embargo on the export of tea, the situation is not so bad at the present moment as it was expected to be a year ago. It is pointed out that consumption is increasing everywhere, most remarkably in countries where until lately tea has not been popular, while there seems to be a growing tendency to supply all the forces on active service with tea in preference to alcohol.—*Indian Planters' Gazette.*

The Planters' Chronicle.

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THE U. P. A. S. I.

(INCORPORATED)

Contents.

The Scientific Officer returned to Head Quarters on Tuesday 25th from his tour in North Mysore.

The Secretary, U. P. A. returned to Bangalore from leave on Friday 28th.

The Planting Expert publishes an article on the Analytical Branch of the Scientific Department.

We publish the proceedings of the Meeting of the Wynaad Planters' Association.

We also publish the Minutes of the first Committee Meeting of the South Indian Branch of the Rubber Growers' Association.

Continued is the interesting article on Science and Civilisation.

A letter from France from Mr. Cree will be read with great interest.

Mr. Parton writes on Spraying Coffee.

SOUTH INDIA PLANTERS' WAR FUND.

	Rs.	A.	P.
Amount previously subscribed	33,931	8	0
Mr. R. H. Crowther	10	0	0
,, S. M. Hight	100	0	0
,, Noel Hight	50	0	0
,, Lance Hight	50	0	0
,, E. Travers Drapes	10	0	0
,, C. E. Foster	25	0	0
,, Irvine Stewart	10	0	0
,, N. D. Pollock	30	0	0
,, P. Napier	20	0	0
Contribution by a Bolter	19	3	0
Total Rs...	34,255	11	0

OVERSEAS AIR CRAFT FUND.

Amount previously subscribed	4,458	14	0
Mr. E. C. Foster	25	0	0
Total Rs...	4,483	14	0

SCIENTIFIC DEPARTMENT, U. P A. S. I.

Analytical Branch of the Scientific Department.

In the pamphlet issued by the U. P. A. S. I. on the Past History and Proposed Development of their Scientific Department it was stated that the Executive Council had decided to appoint an Assistant to work under the supervision of the Planting Expert so that the Scientific Department might be able to undertake the analyses of Soils, Fertilisers, &c. for planters, a small fee being charged for each analysis.

Unexpected and unforeseen difficulties were encountered in obtaining a suitable man for this post, resulting in an accumulation of work which could not be adequately dealt with. This is to be regretted and apologies are due to those who sent in samples of soil for analysis and have not yet received results.

The original difficulties have now been satisfactorily overcome and Mr. M. R. Viswanatha Iyer F. C. S. has been appointed Assistant Chemist and with the New Year took up his duties and is now hard at work clearing off the accumulated soil samples and making analyses of fertilisers as soon as they are sent in. Mr. Viswanatha Iyer is a diplomate of the Victoria Jubilee Technical Institute, Bombay and was for three years, before accepting his present appointment, the First Assistant Chemist of the Scientific Department of the Indian Tea Association at Tocklai under Mr. Hooper.

There can be no doubt that the establishment of an analytical branch of the U. P. A. Scientific Department fufills a long felt want and that we can congratulate ourselves on having made a move in the right direction and on 'something done.' Advantage is already being taken of the facilities offered by the Department and samples of fertilisers are frequently received for analysis, the checking of guarantees and so on, while there are enough soil samples in hand to keep the Assistant fully employed till at least the end of April.

The venture is in the nature of an experiment and we look to planters to make it a success by supporting it with work. We welcome samples of fertilisers at all times, and after April hope to receive a steady inflow of soil work. The fees charged as may be seen from the advertisement pages of the *Chronicle* are absurdly small so that a steady supply of work is necessary to make this branch of our Department self supporting. The necessity for analyses has often been insisted upon. Soil analyses should certainly be the basis of all manurial systems, for although a chemical or mechanical analysis of a soil will not solve all the problems connected with it, it goes far to indicate the lines along which it may be most profitably manured and cultivated, while the more samples and types of soil that are analysed from any one district the easier it becomes to give reliable advice as to the way in which they may best be handled.

The necessity for the checking of fertiliser guarantees is constantly apparent, while the value of indigenous and local fertiliser materials can only be judged from a chemical analysis.

A new and long needed power has now been placed in the hands of the Scientific Department which will greatly increase its efficiency: it is for planters to make full use of it.

RUDOLPH D. ANSTEAD,
Planting Expert.

DISTRICT PLANTERS' ASSOCIATIONS.

Wynaad Planters' Association.

Proceedings of a Meeting held in Meppadi Club, on 12th January, 1916.

PRESENT.—Messrs. C. E. Abbott, R. Copland, T. S. Gillatt, I. Stewart, A. E. Vernede, H. B. Winterbotham and N. C. Whitton (Honorary Secretary).

Mr. Abbott in the Chair.

2002. NEW MEMBERS.—Messrs. E. A. Cheesman, W. Morres, I. Stewart, and R. F. Vinen were elected members.

2003. PROCEEDINGS OF LAST MEETING.—Were confirmed.

2004. POST OFFICES.—(*a*) Read letter from the Superintendent of Post Offices, Malabar Division, stating that the Sub Post Office, now known as Pootoomulla, is to be split up into two extra Departmental Branch Post Offices. One will be located on Pootoomulla Estate and be known as Pootoomulla Post Office; the other will be located on Churalmalla Estate and will be known as Velleramalla Post Office. Recorded with satisfaction.

(*b*) Mr. Copland drew attention to the fact that the telegraph wire to Sultan's Battery had been connected with Nellacotta and the instruments have installed at Sultan's Battery, but that owing to the wires having fallen down no communication has been established. Proposed, "That the attention of the Postmaster-General (Traffic) be drawn to this and he be requested to remedy it."—Carried unanimously.

(*c*) The Honorary Secretary was requested to write to the Postmaster-General, Madras, to ask if the original hours of posting at the Meppadi Post Office cannot now be restored.

2005. ROADS.—Read letter from the Chief Engineer P. W. D. with reference to the re-allotment of funds for the Calicut-Mysore Frontier Road, The Meeting recorded the letter with satisfaction, but regret was expressed that, through lack of funds, work had been stopped during the best road repairing months.

A letter was read from the President of the Malabar District Board enclosing copy of his letter to the Executive Engineer, West Coast Division, stating that the timber Chowki is to be moved from Vayitri to the Calicut side of the Lakkadi Toll gate, and that another Chowki is to be placed at Tamaracherry.—Noted.

2006. LABOUR LAW.—The Honorary Secretary placed a copy of the Judgment in the Association's recent High Court case on the table.

2007. PLANTERS' WAR FUND.—The Chairman announced that Rs. 213 had been promised by Members in monthly subscriptions and Rs. 590 as donations to this Fund. Subscribers are asked to send in their promised donations or subscriptions, as soon as possible.

2008. LADIES DEPOT FETE.—Read letter from the Military Secretary to the Governor of Madras with reference to Mrs. Gillatt's Motor car stating that the amount realised on the car was Rs. 674, and the Honorary was requested to express Lady Pentland's gratitude for the gift.

SCIENTIFIC DEPARTMENT, U. P A. S. I.

Analytical Branch of the Scientific Department.

In the pamphlet issued by the U. P. A. S. I. on the Past History and Proposed Development of their Scientific Department it was stated that the Executive Council had decided to appoint an Assistant to work under the supervision of the Planting Expert so that the Scientific Department might be able to undertake the analyses of Soils, Fertilisers, &c. for planters, a small fee being charged for each analysis.

Unexpected and unforeseen difficulties were encountered in obtaining a suitable man for this post, resulting in an accumulation of work which could not be adequately dealt with. This is to be regretted and apologies are due to those who sent in samples of soil for analysis and have not yet received results.

The original difficulties have now been satisfactorily overcome and Mr. M. R. Viswanatha Iyer F. C. S. has been appointed Assistant Chemist and with the New Year took up his duties and is now hard at work clearing off the accumulated soil samples and making analyses of fertilisers as soon as they are sent in. Mr. Viswanatha Iyer is a diplomate of the Victoria Jubilee Technical Institute, Bombay and was for three years, before accepting his present appointment, the First Assistant Chemist of the Scientific Department of the Indian Tea Association at Tocklai under Mr. Hooper.

There can be no doubt that the establishment of an analytical branch of the U. P. A. Scientific Department fufills a long felt want and that we can congratulate ourselves on having made a move in the right direction and on 'something done.' Advantage is already being taken of the facilities offered by the Department and samples of fertilisers are frequently received for analysis, the checking of guarantees and so on, while there are enough soil samples in hand to keep the Assistant fully employed till at least the end of April.

The venture is in the nature of an experiment and we look to planters to make it a success by supporting it with work. We welcome samples of fertilisers at all times, and after April hope to receive a steady inflow of soil work. The fees charged as may be seen from the advertisement pages of the *Chronicle* are absurdly small so that a steady supply of work is necessary to make this branch of our Department self supporting. The necessity for analyses has often been insisted upon. Soil analyses should certainly be the basis of all manurial systems, for although a chemical or mechanical analysis of a soil will not solve all the problems connected with it, it goes far to indicate the lines along which it may be most profitably manured and cultivated, while the more samples and types of soil that are analysed from any one district the easier it becomes to give reliable advice as to the way in which they may best be handled.

The necessity for the checking of fertiliser guarantees is constantly apparent, while the value of indigenous and local fertiliser materials can only be judged from a chemical analysis.

A new and long needed power has now been placed in the hands of the Scientific Department which will greatly increase its efficiency: it is for planters to make full use of it.

RUDOLPH D. ANSTEAD,
Planting Expert.

DISTRICT PLANTERS' ASSOCIATIONS.

Wynaad Planters' Association.

Proceedings of a Meeting held in Meppadi Club, on 12th January, 1916.

PRESENT.—Messrs. C. E. Abbott, R. Copland, T. S. Gillatt, I. Stewart, A. E. Vernede, H. B. Winterbotham and N. C. Whitton (Honorary Secretary).

Mr. Abbott in the Chair.

2002. NEW MEMBERS.—Messrs. E. A. Cheesman, W. Morres, I. Stewart, and R. F. Vinen were elected members.

2003. PROCEEDINGS OF LAST MEETING.—Were confirmed.

2004. POST OFFICES.—(*a*) Read letter from the Superintendent of Post Offices, Malabar Division, stating that the Sub Post Office, now known as Pootoomulla, is to be split up into two extra Departmental Branch Post Offices. One will be located on Pootoomulla Estate and be known as Pootoomulla Post Office; the other will be located on Churalmalla Estate and will be known as Velleramalla Post Office. Recorded with satisfaction.

(*b*) Mr. Copland drew attention to the fact that the telegraph wire to Sultan's Battery had been connected with Nellacotta and the instruments have installed at Sultan's Battery, but that owing to the wires having fallen down no communication has been established. Proposed, "That the attention of the Postmaster-General (Traffic) be drawn to this and he be requested to remedy it."—Carried unanimously.

(*c*) The Honorary Secretary was requested to write to the Postmaster-General, Madras, to ask if the original hours of posting at the Meppadi Post Office cannot now be restored.

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2009. THE ILLICIT CULTIVATION OF COCA IN WYNAAD.—A letter was read from the Assistant Commissioner of Salt, Malabar Sub Division, pointing out that there are coca plants growing on certain Estates in Wynaad and that the cultivation of this product has now been stopped by Government. The Honorary Secretary was instructed to reply that, from the information he has been able to gather, the plants are not being grown for commercial purposes.

Members will note that the growing of this plant is now illegal.

2010. SMALL FOREST RESERVES.—Correspondence was read with the Honorary Secretary of the Nilgiri Planters' Association on the matter of asking Government to give the Local Government powers to grant small patches of Forest Reserves, intersecting cultivated areas, but not serving as stream reserves.

The Honorary Secrtary was instructed to reply that this Association is quite ready to support the Nilgiri Association in any action they may take although the matter has hitherto not been brought forward by a member of this Association.

2011.—PEST ACT.—Attention was called to Mr. Anstead's letter of the 15th of December 1915, and the copy of the Act. This subject will come up at the next Meeting and Members are asked to give their special attention to the subject.

PAPERS ON THE TABLES.—(*a*). Correspondence, (*b*). Report of the Department of Agriculture.

A Vote of thanks to the Chair terminated the Meeting.

(Signed) C. E. ABBOTT,
Chairman.

(„) N. C. WHITTON,
Honorary Secretary.

FEDERATED MALAY STATES.

Rubber Exports during November 1914.—The following figures of the exports of cultivated rubber from the Federated Malay States during the month and eleven months ended 30th November, 1915, are from telegraphic information received by the Malay States Information Agency in London, the corresponding figures for 1914 being added for purposes of comparison :—

	1914.	1915.
	Tons.	Tons.
November ...	2,889	4,636
January-November ...	27,336	39,413

Rubber Exports during September ; Corrected Figure.—According to a statement issued by the above-mentioned Agency, the exports of cultivated rubber from the Federated Malay States during the month of September last were 3,984 tons, *viz.*, 650 tons above the figure given in the returns for that month received by the Agency (see p. 57 of the *Board of Trade Journal* of 7th October).—*The Board of Trade Journal.*

RUBBER GROWERS' ASSOCIATION.

South Indian Branch of the Rubber Growers' Association.

A Committee Meeting of the South Indian Branch of the Rubber Growers' Association, was held at the Quilon Club, on 11th December, 1915, at 3 p.m.

PRESENT.—Messrs. J. A. Richardson, Anamalai P. A., H. M. E. Howson, Mundakayam P. A., J. Stuart, South Travancore, P. A., H. H. Jones, Messrs. Aspinwall & Co., Ld., J. Vickers, Messrs. Darragh Smail & Co., J. Mackie, Messrs. Harrisons and Crosfield, Ld., Fletcher Norton, Secretary, U. P. A. S. I.

Mr. Norton read the notice calling the meeting.

In unavoidable absence of the Chairman, U. P. A., Mr. J. A, Richardson was elected Chairman.

Mr. Norton read the following letter from the Chairman, U. P. A.

Sallebile, Kadur District,
30th December, 1915.

FLETCHER NORTON, ESQ.,
Secretary, U. P. A. S. I.,
Bangalore.

Dear Sir,—

Rubber Growers' Association Branch Committee.—I regret to say, that having returned from a long tour in Malabar, I am unable to attend the meeting called for the 11th instant at Quilon. I shall feel obliged by your expressing to the members of the Committee my regret at being unable to attend the opening meeting.

I enclose copy of a letter addressed to Mr Campbell Hunt by Mr. Welldon and which Mr. Welldon sent to me. It makes several points clear and should prove useful.

I shall be obliged by your expressing at the meeting my views on the following subjects and which I have arrived at, after careful perusal of the correspondence with the R.G.A. and the resolutions passed at Bangalore in August last.

(*a*) That the U.P.A.S.I. is the South Indian Branch of the R. G. A.

(*b*) That a Committee has been appointed by the U.P.A.S.I. at the suggestion of the R. G. A. to deal with the business of the S. I. Branch of the R. G. A.

(*c*) That the Chairman and Secretary of the U.P.A.S.I. are *ipso facto* members of the Committee.

(*d*) That the Commtttee has power to add to its members.

(*e*) That for the convenience of Rubber men, the Committee shall hold its meetings in conjunction with the Travancore Combined Associations.

(*f.*) That the business of the Committee as laid down by the R. G. A., in their minutes is as follows :—

> "The work as representatives of this Association would consist in "bringing before the Council all and sundry matters that may "suggest themselves for the good of the industry in general, and "Southern India in particular, and keeping it advised upon any "matters of importance which from time to time may arise."

(g.) That the R. G. A. has requested the U. P. A. S. I. as an incorporated body to form a Committee. The Committee therefore stands in the same relationship to U. P. A. S. I., as the Scientific, Finance. Control or any other Committee controlling a Department of the U. P. A. S. I. Similarly the Chairman and Secretary of the U. P. A. S. I. should be Chairman and Secretary of the Committee. A Vice Chairman should be elected to occupy the Chair when the Chairman is unable to attend.

(*h*) *That only Estates which are members of the R. G. A. will receive information from the Research Departments, etc.*—I would suggest therefore that the Committee take steps to find out which estates in S. India are members at present and those which are not, be asked to join, and as they are not likely to join until they know what subscription they may be called upon to pay, the R. G. A. be asked to let the Committee know at an early date, the rate of subscriptions payable from January next.

(*i*) In putting the correspondence with the Ceylon Rubber Research Scheme before the Committee, I should like to point out with regard to the Research work in S. India, the Madras Government is taking over our Scientific Department and I have reason to believe this will take place early next year, and that it will become a very large and well equipped organisation. I am of opinion that our Scientific Officer should be asked to put himself in communication with the Ceylon Rubber Research Scheme, with a view to arranging a Scheme of Rubber Research in S. India. It would, I think, be a breach of etiquette for the Committee to deal direct with the Ceylon Research Scheme.

(*j*) The meeting will afford an unique opportunity for discussing tonnage and freight with the Representatives of the leading West Coast Firms. It seems possible that little or no tonnage may very shortly be available and there seems no reason why shipowners should not double the already existant rates of freight.

(*k*) I have not put Finance on the Agenda but it is a matter for the consideration of the Committee. The R.G.A. in its minutes states :—

> "If this Association is willing to undertake this work, a reasonable "sum should be voted annually in payment of the Secretarial "and office expenses."

The question the Committee has to decide is :—

I. Is the present time opportune for asking for a contribution ?

II. If so, what amount should be asked for ?

As regards (I) South Indian Rubber is small industry as compared with Ceylon and Malaya and at present, subscriptions from S. India to the R. G. A. are insignificant and it may be considered advisable to wait until more Estates become members before putting in a claim.

As regards (II) the income of the U. P. A. S. I. is severely taxed and cannot afford to pay travelling expenses of its officers to Quilon, Stationery, Postages etc. while some remuneration is due to the Secretary for the extra work thrown on his shoulders, as is done by the Labour Department. The Committee when passing a resolution on this subject, will no doubt consider these points.

I have perhaps dealt at what may appear unnecessary length with the several subjects likely to be discussed at the meeting. I have done so because it seems probable the members of the Committee have not had an opportunity of studying the correspondence, which had led to the formation of the S. Indian Branch of the Rubber Growers' Association.

Yours faithfully.

(Signed) C. H. BROWNE,

Chairman.

Proposed from the Chair that Mr. Mackie of Messrs. Harrisons and Crosfield be asked to join the Committee.—Carried.

The following rules were passed.

I. That the U. P. A. S. I. is the South Indian Branch of the Rubber Growers' Association.

II. That the Chairman and Secretary of the U. P. A. S. I. are *ipso facto* members of the Committee and as such will act as Chairman and Secretary of the South Indian Branch of the Rubber Growers' Association. In the event of the non-attendance of the Chairman, a Chairman should be elected by the meeting.

III. That the Committee shall consist of eight Planting Members and four representatives of Mercantile Firms with power to add to their number in accordance with the resolution passed at the Annual General Meeting of the U.P.A.S.I. in 1915.

IV. That for the convenience of Rubber men, the Committee shall have its meetings at Quilon or any other convenient centre to be decided on by the Committee.

V. That four representatives shall form a quorum.

The following resolutions were passed:

No. 1. That this Committee recommend that the Secretary, U.P.A.S.I. be allowed Rs. 50 a month remuneration for himself and Rs. 20 per month to cover postages and Stationery to take effect from 1st January 1916—these expenses to be met by the Rubber Growers' Association.

No. 2. That this Committe recommend all Rubber Estates in South India to become members of the Rubber Growers' Association on paying their subscription through the Secretary of the U.P.A.S.I. and receiving all information direct from the R. G. A, such information to be directed to Superintendents of Estates, and not by name.

On the question of amalgamation of Ceylon and Malaya Research Funds with the Rubber Growers' Association and Research work in South India coming up for discussion, the Secretary read Mr. Welldon's letter to Mr. Campbell Hunt, communicated by the President; it was decided that until further information was received from the R.G.A. the correspondence on these subjects should be left in the hands of the Scientific Department of the U.P.A.S.I. to conduct.

Freights and Tonnage were discussed but nothing hopeful was elicited from the Representatives of the Mercantile Firms.

Freight on the 11th instant stood at	...	82/6
,, 1st Jany. would be	...	87/6
,, 1st Feby. ,,	...	97/6

Ceylon rates were still 80 shillings.

The Secretary was instructed to write to District Associations to invite their members to join the Rubber Growers' Association and to inform him in return if any of their members were already members of the Rubber Growers' Association and how many more were likely to join.

The proceedings then terminated with a vote of thanks to the Committee of the Quilon Club for the use of their Club and to the Chairman.

J. A. RICHARDSON,
Chairman.

FLETCHER NORTON,
Secretary.

SCIENCE AND CIVILISATION.

(*Continued.*)

The forces which have interested mankind range from those cosmic forces which operate on a scale so stupendous that we have no control over them, down through those forces which we can control to a limited extent, and on to those which are absolutely subject to human control. We are not able to limit or to increase the output of the sun's heat, and we cannot guide the movements of the comets, planets, and stars in their orbits. We do not know how to stay the wind and the rain, but we can apply them, in a limited degree, to our purposes, and we can do much to protect ourselves from their injurious effects. The forces which govern the daily life of the individual, the community, and the nation, and which govern the relations of individuals, communities, and nations to each other are, with rare exceptions, either absolutely under human control or such control is a hopeful aspect of the near future. These forces are the means to certain logical ends, and we cannot question that they also operate unerringly according to law. Whether they shall be applied for civilisation or against civilisation is for man to decide. The automobile may be used to bring the physician on an errand of mercy, or to hasten the robber to a place of concealment and immunity. High explosives will cut a canal through the Culebra ridge, or deal destruction from a 12-in. shell. The American army may establish local self-government in Cuba from the highest of humanitarian motives, or it may wage a war of conquest on a weak neighbouring country from the low motive of increasing the power of human slavery as a national institution.

From our experiences upon the earth we have learned to place faith in certain simple laws of nature, amongst which are the following:—

(1) Every particle of matter attracts every other particle of matter, in accordance with the law of gravitation.

(2) Heat always flows from a hotter body to a colder body.

(3) The volume of a given quantity of gas or vapour is a function of the temperature and pressure to which it is subjected.

If a rifle, elevated at a certain angle above the level surface of a lake, gives a certain muzzle velocity to the bullet, the bullet will describe the curve which the law of gravity says it should describe, and strike the water where the law says it should strike, provided we take into account two small factors that are also acting—the resistance of the air and the rotation of the earth.

A red-hot cannon ball and a red-hot bullet, thrown into a great bank of snow, will both cool down to 32° F.; the great cannon ball slowly and the little bullet rapidly.

A rubber balloon containing a given quantity of hydrogen gas can be so proportioned that if thrown from a high tower on a hot summer day it will expand and rise, or on a cold winter day it will contract and fall.

If a comet, a hundred million miles away, more or less, is observed very accurately as to its direction from us to-night, again next Monday night, and a third time in two weeks from to-night, Newton's law of gravitation will enable us to determine the curve in which the comet is travelling around the sun, and to say where the comet may be seen three months or six months later.

The great stars and the small stars radiate their heat energy into surrounding space: the great stars cool off extremely slowly, and the small stars comparatively rapidly. Examples of this principle, it is believed, are the great sun, on one hand, its volume 1,300,000 times the earth's volume, its surface temperature higher than 10,000° F., and its interior temperature immensely higher yet; and the little earth, on the other hand, cool on the surface and relatively cool in the interior.

As the great gaseous suns radiate their heat energy unceasingly into surrounding space, they undoubtedly grow slowly smaller under the force of their own internal gravitation, which strives constantly to pull each molecule of gaseous matter to the centres of the stars.

There is every reason to believe that the three simple laws which we have quoted and illustrated are fundamental, and operate invariably throughout the stellar universe.

And so it is, so far as human experience has gone, with all the laws of nature.

To some people this infallible and universal obedience to law—the strict accountability of effect to cause—seems a hard and cruel fact and counter to idealism in its various forms. This is a hasty and faulty view. It is the cause-and-effect relationship which gives us something dependable upon which to build our civilisation. The recognition of this principle, whether conscious or unconscious, is the chief difference between modern civilisation and the civilisations which prevailed in the days of the inquisition and of the Salem witchcraft. Looking at this subject from the idealistic point of view, the conception that all matter in the universe is endowed with the property of obeying law—unalterably obeying law—is incomparably grander than the conception of one law prevailing here, another law prevailing there, of irresponsible caprice operating both here and there.

History affords no more remarkable phenomenon that the retrograde movement in civilisation which began with the decline of Roman power and continued for more than a thousand years, approximately to the epoch of the Borgias, Columbus, and Copernicus. There had once existed a wonderful Greek civilisation, but for twelve or fifteen centuries it was so nearly suppressed as to be without serious influence upon the life of the European people. Greek literature, one of the worlds priceless possessions. not surpassed by the best modern literatures, was as complete two thousand years ago as it is to-day. Yet in the Middle Ages, if we except a few scattered churchmen, it was lost to the European world. A Greek science never existed. Now and then, it is true, a Greek philosopher taught that the earth is round, or that the earth revolves around the sun, or speculated upon the constitution of matter; but excepting the geometry of Euclid and Archimedes, we may say that nothing was proved and that no serious efforts were made to obtain proofs. There could be no scientific spirit in the Greek nation and civilisation as long as the Greek religion lived and the Greek people and Government consulted and were guided by the Greek oracles. If there had been a Greek science, equal in merit with modern science, think you that stupidity and superstition could have secured a strangle hold upon Greek civilisation and have maintained a thousand years of ignorance and degradation? Intellectual life could not prosper in Europe so long as dogma in Italy, only 300 years ago, in the days of Bruno and Galileo, was able to say, "Animals, which move, have limbs and muscles; the earth has no limbs or muscles, therefore it does not move;" or so long as dogmain Massachusetts, fewer than 250 years ago, was able to hang by the neck until dead the woman whom it charged with "giving a look toward the great meeting-house of Salem, and immediatelely a demon entered the house and tore down a part of the wainscoting." It was the re-birth of science, exemplified chiefly by astronomy, and secondarily by medicine, which gave to the people of Europe the power to dispel gradually the unthinkable conditions of the Middle Ages.

Shall we try to estimate what astronomy, an ideal science, sometimes called an unpractical science, has done for mankind? We shall not dwell upon its so-called practical applications, such as the supplying of

accurate time, the sailing of ships precisely to their destinations on the other side of the great oceans, the making of accurate maps of the continents and islands, the running of boundary lines between nations, the predicting of times of high and low tides, and so on; we shall consider only the pure knowledge side of the subject.

Conceive of the earth as eternally shrouded in thick clouds so that the earth's dwellers could never see the sun, the moon, the stars, and the nebulæ, but not so thick that the sun's energy could not penetrate to the soil and grow the crops. Under these conditions, we might know the earth's rock strata to the depth of a mile or two, we might know the mountains and the atmosphere to a height of two or three miles, we might acquire a knowledge of the oceans, but we should be creatures of exceedingly narrow limits. Our vision, our life, would be confined to a stratum of earth and air only four or five miles in thickness. It would be as if the human race went about its work of raising corn for food and cotton for raiment, always looking down, never looking up, knowing nothing of the universe except an insignificant stratum of the little earth. This picture is only a moderately unfair view of life as it existed on our planet four hundred years ago, before the days of the telescope, the spectroscope, and the photographic plate, and before the days of freedom of speech and thought. The earth is no longer flat, supported on the back of a great turtle which rests upon nothing; it is round, and we know why; and it revolves around the sun in exact obedience to law. The stars are not lanterns hung out in the sky by angels at night; they are suns, hundreds of millions of suns, each on the average comparable in size to our sun. Exists there an intelligent man in the world whose thoughts, every day and many times a day, are not adapted to these facts? Who can estimate the value of this knowledge to the human race?

We have not yet seen little earths revolving around any stars except our own, nor do we know that intelligent beings live upon such planets and are looking down towards our system and seeing our sun as a little star in their night sky; but everybody now holds as absurd the view that our star is the only one of the hundreds of millions of stars which has little planets revolving around it, or that our earth is the only one that is inhabited by intelligent life. Can there be a more inspiring thought than that intelligent beings are probably living here and there throughout the universe, in whatever direction we may look? The spectroscope has shown that the chemical elements which compose the earth are also the constituents of our sun and of the other suns. We have no reason to doubt that the chemistry of the earth is the chemistry of the universe. The spectroscope and the photographic plate are telling us of the close relationship of the nebulæ to those stars which we call the youngest stars, of the young stars to the middle-aged stars, and of the middle-aged stars, to the old stars. We cannot doubt that the stars are growing older, as we are growing older, as everything in nature is changing and growing older, and in accordance with the same laws which govern the changes on the earth. The student of double stars finds that the movements of the two components of a distant double star system are in accordance with the law of gravitation. Every particle of our experience leads us to believe that the reign of the laws which control our everyday affairs is universal; that the strict relationship of cause and effect applies throughout the stellar system. Does not this broad and stable foundation give valued confidence to those who are building the structure of the other sciences, the structure of everyday life, the structure of civilisation?

(To be Continued.)

CORRESPONDENCE.

10th, Service Battalion,
Royal Welch Fusiliers,
21-12-1915. B. E, F.,
France,

THE SECRETARY,
United Planters' Association of Southern India.

Dear Sir,—I received your letter of the 9th ultimo, two days ago and I think the reading of it gave me more pleasure than most things have done since I came over to France or even to England for that matter, for it shows we are not forgotten out East. I am glad to be able to tell you that I stand at present in no need of assistance being very fit and well ; and as far as I can see at present, I do not ever expect to do so. But I do appreciate the thought which prompted the sending of your letter and I wish to thank you very much.

Personally I do not think that an officer in these days if he looks after himself should need any assistance beyond what Government gives him. I have been away from the East more than a year now—the precise date of leaving Colombo being the 12th November and beyond £100 which I saved before I left and £50 my firm sent me last spring, I have had nothing except my Army Pay and still have never wanted anything I could't get. By the way I also got 6 months' half-pay when I left as I was due for leave. My Employers would, I think have been kind enough, if I had agreed to come back to them, to give me half-pay all the time I was over here.

The men who probably need assistance are the planters' who didn't take commissions, enlisted, and have been wounded. Their pay is next to nothing and privates don't get too good a time in the ordinary military hospital. I have been trying to get in touch with G. G. Brown and Searanche both of Malayalam T. and R. Coy., but my letters have never reached them. They are still privates I believe and have been wounded. I know of no others.

Out here you may be in the next trench to someone you know and still miss him. It is very hard to meet people as when writing you are not allowed to say where you are and consequently can't arrange a meeting place. I have nothing else worth writing about except to tell you that the Huns will never break through in the West, but that when we get our organising powers tuned up to theirs, we shall be able to. This will probably take another year. It may sound pessimistic but they had too much of a start and this job is too big a thing for us to handle as well as they do. We haven't the men with the experience.

None else could stick to the Salient the way he has done. I was there for only (when I came out) a month but it gave me a pretty good idea of what things are like. Our Division the 3rd is now just at the South end of it and we consider ourselves very lucky.

I have been "resting reserve in billets" as it is called out here—meaning in our particular case a camp under canvas in the usual muddy field associated with the name of Flanders. I am going back to the Trenches this afternoon. So I shall spend Xmas day in them. As far as we are concerned there will be Xmas greetings interchanged and the first Hun who attempts it will get a bullet. Everybody over here, considering all things,

is very well looked after and in the best of spirits and health. No sickness except amongst men who'd go under anywhere. Climate up to date (we are 20 miles in a straight line from the N. Sea) is precisely the same as in England. But it doesn't touch the East and provided I come through with a whole skin my one ambition at present though I have to work my passage is to get back there and never leave it. Rs. 1,000 per mensem, when this war is over would not keep me in the army.

Yours sincerely,
A. V. CREE.

Siddra Bunnoo,
Koppa,
Mysore Province,
January 21st, 1916.

Spraying Coffee.

THE EDITOR,
Planters' Chronicle,

Dear Sir,—Under the supervision of Officials of the Mysore Agricultural Department, who rendered me the very greatest assistance and for which I tender my cordial thanks, I sprayed with Bordeaux Mixture approximately eight acres of coffee, the cost of material and labour working out to about 17-8 per acre.

The area sprayed was in the vicinity of a tank, and under the most favourable circumstances as far as water was concerned.

My impression at present is, that spraying with Bordeaux Mixture for leaf disease is not a practical proposition over a large acreage on most estates.

The cost of material and labour together with the necessity of having a great number of Sprayers in order that the work may be carried out just in the three months or so when weather conditions permit being more than most planters can afford.

Yours faithfully,
F. J. PARTON.

AGRICULTURAL AND FOREST PRODUCTS.

CEYLON.

Rubber Exports in August.—The following statistics of the exports of rubber of domestic production from Ceylon during the month of August, and the eight months ended August, 1914 and 1915, have been extracted from Official returns issued by the Ceylon Government :—

To	Aug. 1914. lbs.	Aug. 1915. lbs.	Jan.-Aug. 1914. lbs.	Jan.-Aug. 1915. lbs.
United Kingdom ...	1,844,508	2,042,367	11,180,494	18,195,194
United States ...	587,542	1,805,178	5,060,877	10,182,169
Other Countries ...	136,954	167,043	4,034,290	1,666,909
Total exports of rubber of domestic production...	2,569,004	4,014,588	20,275,661	30,044,272

The Planters' Chronicle.

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(INCORPORATED.)

Contents.

The Scientific Officer left on Thursday the 3rd for Pusa to attend the Agricultural Conference and will not be returning until about the 15th instant. Dr. Coleman, Director of Agriculture to the Mysore Government also went on the same day to attend the same Conference. We believe that we are correct in saying that Dr. Coleman has traced the failure of Mango blossom to a fungus and that spraying will make this "a thing of the past." We hope that when he has convinced himself of this that he will give his discovery and its cure to the public.

We publish a report by the Planting Expert of a Tour in North Mysore which makes very interesting reading, giving valuable suggestions and reporting not unfavourably on Rubber, as an adjunct to coffee in a District in North Mysore.

We conclude in this issue the very interesting article on Science and Civilisation, taken from "*Nature*." It shows the high value set on Scientific Research in every walk in life. Though scientific research will not probably *cure* all the diseases to which the agricultural Industries in India are subject to, it will undoubtedly vastly *minimise* their ill effects.

R. D. A. send us some extracts on Green Manuring in India by A. C. Dobbs, Offg. Imperial Agriculturist, and recommends that the bulletin "should be in the hands of all planters in India."

The Director of the Labour Department sends us an extract from the *Ceylon Times* on the abolition of the Tundu.

SOUTH INDIA PLANTERS' WAR FUND.

	Rs.	A.	P.
Amount previously subscribed	34,255	11	0
Mr. Charles Hendry	50	0	0
Messrs. Barber & Pascoe	75	0	0
Mrs. F. M. Lake	10	0	0
Mr. Stephen Bayley	10	0	0
Total Rs...	34,400	11	0

OVERSEAS AIR CRAFT FUND.

Amount previously subscribed	4,483	14	0
Total Rs...	4,483	14	0

SCIENTIFIC DEPARTMENT, U. P A. S. I.

Report on a Tour in North Mysore.

Leaving Bangalore on 9th January and returning on 24th January, I made a tour of inspection of Estates in the Kalasa and Sallehile Districts of North Mysore and had the pleasure of meeting a number of planters.

Coffee Crops as a whole are poor this year, and outturns appear to be bad, but the the crop is variable. On some places, especially at the higher elevations, there is a good crop, in some instances a very heavy one, while at lower elevations there is hardly any at all. The Coffee on the whole looks well and promises a big crop next year given favourable blossom showers. Golden Drop Coffee appears especially to have a big crop.

At Mavinkere Estate, I saw the Coffee Drier installed last year at work. It is proving very satisfactory and it is intended shortly to publish a separate report on it giving details of its working and the results obtained.

The difficulty of getting supplies to grow in old Coffee land, on poor patches, and so on, is a complaint constantly heard. There are several reasons for this, one being the interference of the shade tree roots which fill the pits and choke the young plant, but there is another factor which appears to be lost sight of and which in some cases at any rate undoubtedly has a great deal to do with the failure. On stiff land and in soil which has lost tilth and cakes hard in the dry weather and puddles in the wet, on pulling up the dying supplies 90% or more will be found to have turned tap roots, even though they have been carefully planted and were in many cases basket plants. This is due to the fact that the pits were filled during the wet weather. The soil easily puddles and the bottom of the pit thus filled is in the nature of a brick and the growing root is unable to penetrate it and is turned back on its course as if it had struck a stone, with the result that the plant is strangled and during the hot weather drops its leaves and primaries for want of water and becomes permanently weakened or actually dies. If the pits on such soil are filled in the dry weather this difficulty will be removed. The liming of this type of soil and the incorporation with it of large quantities of humus, which might be derived from Dadap planted thickly and kept lopped, will go far to overcome the difficulty which is found in raising supplies.

During my tour I saw on several estates areas of Coffee which had been sprayed with Bordeaux Mixture. In all cases it appeared to me that the appearance and general health of these sprayed trees was decidedly better than that of surrounding unsprayed areas. The sprayed trees contained more foliage and the leaves were of a darker green colour than those on unsprayed trees, denoting a more vigorous and healthy state.

In my opinion, it has been demonstrated beyond cavil that spraying with Bordeaux Mixture does protect the Coffee from attacks of leaf disease and thus make it more healthy. Whether spraying on a large area is a practical proposition and whether it will pay to spray are points for the planter to decide for himself. Mr. Parton in a latter to the *Chronicle* curtly dismisses the idea and says it is not practical. I cannot altogether agree with him. It *can* be done. Power sprayers may be necessary instead of hand sprayers and they are in everyday use in other countries. Probably the best thing would be for several neighbouring estates to combine and buy a power spraying outfit between them. These are details which need working out, but spraying *could* be done over large areas if planters made up their minds to do it, As to whether it would pay, that is

an entirely different question. Hand spraying according to Mr. Parton costs Rs. 17-8 per acre. What is the loss per acre due to leaf disease? If the moans I hear on all sides about the damage caused by leaf disease, are justified the loss caused by it must be very much greater than Rs. 17-8 per acre.

The line of study I propose the Scientific Assistant should take up this year is the spraying of large areas and the possible reduction of cost of materials by substituting Washing Soda for Lime in Bordeaux Mixture.

I was much interested in the practice of rennovating old Coffee by cutting it down, forking and manuring and replanting shade, which is being adopted on some estates. The results appear to be very satisfactory. This practice is not carried out in quite the same way in North Mysore as it is in Coorg and I do not think the results obtained are quite so good. A description of the Coorg method will be found in the *Chronicle* p. 279. Vol. IV and p. 5. Vol. V.

In a recent report on a visit to South Mysore, I had occasion to speak of the possibility of improving the present strain of Coffee by seed selection. On this tour I was much impressed with the yielding qualities of Golden Drop Coffee. I also saw Hybrids in several places and in one place we picked six seers of ripe cherry from a Hybrid tree which was not particularly big nor had it a particularly heavy crop. Another two seers were left on it for a second picking. This rate of yield is far better than ordinary *arabica* and points to the fact that a better type of Coffee could be arrived at than the present one if only the problem was tackled in the right way.

While in the District I saw several clearings of *Coffee robusta*, one of two acres planted 6 x 6 in 1911 at an elevation of 3500. This latter was on a hot east facing and had insufficient shade, but it was bearing a fairly heavy crop. An average primary contained ten bunches with 45 berries in a bunch.

It would appear that in some situations this variety of Coffee will grow quite well and might be made to replace *arabica* with possible advantage. It certainly appears to grow well and rapidly in very poor soil. Its root development is rapid and intense and it needs a loose friable soil with a good deal of sand which should be well drained and kept limed. It should be planted wider than *arabica*—probably 12 x 12 will be about right,—and topped at 5 feet. In its earlier stage at any rate it bears chiefly primaries.

It has been stated on many occasions that this variety is less liable to disease than other coffee but this would appear not to be the case. In the Bulletin of the Imperial Institute (1912) it was stated "Soon after the discovery of the plant it was stated that a species of Coffee practically immune from leaf diseases had been obtained and high hopes were entertained of the discovery. It would seem, however, that these hopes are to be by no means fully realised, since, under cultivation in Java, *C. robusta* is proving susceptible to leaf disease though up to the present the attacks are not serious. In the Federated Malay States Bancroft reports that leaf disease is as prevalent on *robusta* as it is on *liberica*."

A similar thing will evidently be experienced in Mysore for I saw one tree as badly attacked by leaf disease as any *arabica* ever was, while many of the trees had a certain amount of the fungus.

Green Bug attacks it badly owing to the sappy nature of its growth and on one estate in Malabar this scale killed a considerable number of *robusta* plants.

The article in the Bulletin of the Imperial Institute quoted above continues, " Similar statements as to immunity from root disease have also proved to be unfounded. Bancroft finds in the Federated Malay State *Fomes semitostus* and *Hymenochaete noxia*, both well known root diseases, have been found to attack the roots of robusta coffee."

Thus though this variety of Coffee may prove of value, planters must not imagine that it is going to be immune to the usual Coffee diseases.

It is of great interest to note what is being done in this District at high elevations with Hevea Rubber. It is usually considered that at high elevations Hevea is not a paying proposition. By itself probably it is not, as it grows very slowly compared with the West Cost. But in conjunction with Coffee, when one can afford to wait for it, it is proving a valuable asset. At Balehonnur, I had the pleasure of seeing some Hevea at an elevation of 2200 to 2800 with an average rainfall of 90 inches. This had had no special attention—in fact it has been badly neglected, the weeds cut down once a year being all that is done in the way of cultivation. For five or six years the trees grew very slowly, but after that they girthed out rapidly, till when seven years old they are of 18 to 22 inches at 38 inches from the ground, and despite their neglect 50 per cent. are tappable. The trees do not grow very tall but have clean straight stems and remarkably thick bark. Tapping has been begun and in nine year old trees planted 15 x 15 a good yield is being obtained. This is evidenced by the fact that an average of 3300 trees tapped daily with two cuts half spiral from 1st November 1915, to 15th January 1916, gave a yield of 996 lbs. of dry sheet and 255 lbs. of dry scrap.

The rubber is being made into smoked sheet and it is very tough and strong. The first 600 lbs. of it fetched Rs. 2'60 in Colombo.

On another estate 1225 trees tapped daily with one cut half spiral from 10th October 1914 to 15th January 1915 gave 7'77 oz of dry rubber per tree which fetched in Colombo, for sheet Rs. 1'61 and scrap Rs. 1'25. In September-October 1915, 609 lbs of sheet were obtained which sold in Colombo at Rs. 2'64 per lb the top price reached on the same day for any rubber being Rs. 2'70. This points to the fact that high elevation Rubber, at any rate in this District of Mysore, is not the 'wash out' that it was thought to be at one time and as adjunct to Coffee it should prove of great value.

RUDOLPH D. ANSTEAD,
Planting Expert.

The clove industry of Zanzibar, according to *Colonial Reports*—Annual No. 823, dates from 1818, and in 1860 an output of about 7,000,000 lbs. in weight had been obtained. In 1872 the plantations in Zanzibar were devastated by a hurricane, and therefore most of the trees in the island at present date from that time. Pemba, however, escaped, and the large plantations there are consequently much older, varying from sixty to ninety years. It is estimated (1913) that there are in both islands about 60,000 acres under clove cultivation, and about 5½ million trees in bearing.—*The Agricultural News.*

THE PLANTER'S LIBRARY.

Green Manuring in India by A. C. Dobbs, Offg. Imperial Agriculturalist, Pusa, Bulletin No. 56 of the Agricultural Research Institute, Pusa. Superintendent Government Printing, Calcutta Price, as. 6.

There is no doubt that insufficient advantage is taken of the valuable practice of Green Manuring by many estates in South India. On Tea Estates especially this method of manuring is extremely valuable and should be more widely adopted. In the Bulletin before us Mr. Dobbs has got together a most useful survey of the work hitherto done on green manuring.

In the General Introduction to the subject the author says :—

"The theory of green-manuring is based on a study of the factors that have been found to underlie fertility of the soil all over the world. The operation of these factors, on the positive side, is, in the main, exceedingly simple.

"The soil, on which vegetation depends for its support and for the supply of a necessary minimum of mineral salts, has a certain physical and chemical constitution, determined primarily by its geological origin and the atmospheric influences to which it is exposed. Vegetation, in turn, affects the soil in several ways. Besides assisting directly in the mechanical disintegration of the soil and sub-soil by means of its roots, and preventing excessive denudation by protecting the surface from climatic influences, it introduces a new factor, in organic or carbonaceous matter elaborated from the carbon dioxide of the air which is absorbed and built up to a high potential by means of the green surfaces which plants spread to catch the sunlight. This organic matter not only adds to the content and alters the physical constitution of the soil, but, with the whole array of reagents into which it is decomposed it may hasten very considerably the chemical decomposition of the soil, which, as also the underlying rock or drift, is more rapidly broken up by solutions of these organic reagents than by ordinary rain water. The greater part of the resulting salts are washed away, but such as are required by plants are absorbed and incorporated by them, and their organic remains thus provide not only a means by which a larger quantity of such salts are annually rendered available, but a reservoir in which a larger proportion of the substances essential to fertility are retained in circulation, within reach of vegetation, than is the case on barren soils in which there is no organic matter.

"The physical alteration of the soil is also usually for the better, both the water-holding capacity and the permeability being as a rule, brought nearer the optimum for plant growth by moderate additions of organic matter.

"Besides these factors of mineral and vegetable matter, the bacteria and fungi form a most important factor in soil fertility. Not only is the decay of dead vegetation chiefly effected by these lowly forms of life, but some, of the bacteria at any rate, provide means by which the nitrogen of the air is 'combined' or 'fixed' and rendered available for the higher plants to which it is indispensible but which have no means of utilizing it directly.

"Of the bacteria which have the power of utilizing free nitrogen, some live on dead organic matter, and when there is a sufficient supply of this, would appear to be capable of providing a very considerable quantity

of combined nitrogen, per acre per annum. But the better known and possibly more important 'nitrogen-fixing' bacteria are those which live in the nodules on the roots of most leguminous, and of a few other plants, and it is on these that the greater part of continually cultivated soils would appear chiefly to depend for the supply of the combined nitrogen which, when water is sufficient, is commonly the weakest link in the chain of fertility.

"The importance of organic matter in cultivated soils—as improving their physical constitution and water-holding capacity, as a reservoir for the retention in circulation, of plant food which would otherwise be washed away, and as a food for certain nitrogen-fixing bacteria—is thus apparent; and the peculiar value of certain leguminous plants, as a means of providing both nitrogen and organic matter in soils in which they are deficient, can be appreciated.

"Such, broadly, are the considerations which have been adduced in recent years to explain the advantages of green-manuring—a practice which consists in the incorporation, in the soil, of vegetation of all kinds, and in the cultivation for this purpose of quickly growing crops, chiefly of the leguminous order, when opportunity occurs."

The Bulletin contains an exhaustive account of the different plants which have been used for the green-manuring of Tea and other crops and the way in which they should be handled and recent literature on the subject scattered through numerous scientific publications is admirably digested and quoted. And it should be in the hands of all planters in South India.

R. D. A.

Valorization Liquidation Funds are held up.

Liquidation of the Brazilian valorization coffee account, in process of settlement when the European war broke out, 14 months ago, has never been completed, and so far the London banking interests which participated in the syndicate have not received any of the proceeds of the Hamburg or the Antwerp holdings sold to Germany. Lying in the bank of S. Bleichroeder in Berlin is an account which has $35,000,000 of valorized coffee assets to its credit. This sum was paid by the German Government for the stock of Hamburg coffee, about 1,750,000 bags, belonging to the syndicate after the beginning of the war. This was sold, it is understood, at about 16 cents a pound, or fully $20 a bag.

The reason the liquidation has never gone farther than the deposit of the funds in a Berlin bank is found in the fact that J. Henry Schroeder & Co., London Bankers, who were party to the contract with the Brazilian Government, were regarded as an enemy-country banking house after the war began, and remittances could not be made from Berlin. The same situation applies to the 500,000 to 750,000 bags of coffee which Germany seized at Anterwerp and settled for with the syndicate. The Havre stock of 1,250,000 bags belonging to the syndicate was, of course, disposed of and the London participants presumably received their share, although the German partners probably did not. This holds up until the end of the war the larger part of the syndicate's proceeds of the valorization coffee stock.—*Simmons' Spice Mill.*

LABOUR DEPARTMENT.

At the Meeting of the Sabaragamuwa Planters' Association of Ceylon the question of the abolition of the "tundu" was again mooted. The following is an extract taken from the *Ceylon Times* of the 27th January, 1916.

"*Labour and Legislation.*—Mr. Crabbe addressed the meeting on the question of labour. The gist of his remarks was that there would never be unanimity among planters and legislation on certain lines was imperative. The first and foremost thing to do was to make the tundu an illegal document at the end of a certain period, during which present advances should have been recovered as far as possible and the remainder written off proportionately each year.

The Chairman said the Honorary Secretary also had a scheme for dealing with this question, which in many ways would fit in with Mr. Crabbe's scheme, and he asked him to explain it.

The Honorary Secretary said that it was similar in as far as it entailed gradual writing off of debts and eventual dispensation with the tundu. He thought those who had advanced money in the past, believing it recoverable, should be protected and be enabled to recover by the tundu these advances if the cooly left before the whole amount was written off. But the on-taking Superintendent should be debarred (if necessary by law), from attaching any debt to these coolies. Thus the money he paid would have to go to expenditure, and coolies having once moved would have no debt. This would check local recruiting enormously as Superintendents would think twice before taking on their neighbours' coolies if they knew they could never recover the amount paid out."

The following is an extract from the Review of the Chairman of the Kelani Valley P. A.:—

"The one spectre with regard to Labour is the practice lately introduced of "notice giving," which has been introduced by an undesirable class for obtaining money in a manner not otherwise legitimate. This matter, gentlemen, is one of the utmost importance and is one that causes great anxiety, and it is our urgent hope that some steps will be made to lighten this burden, which in no way helps our immigrant labourer, whom all in the planting community are striving their utmost to benefit."

From the Annual Report of the same Association the following extract is taken from the *Ceylon Times* of the 28th January, 1916:—

"*Labour.*—The supply of labour throughout the whole district appears to be on a sounder basis than in previous years and outstanding advances have been materially reduced on the majority of estates during the current season.

The movement of labour within the district appears to be getting less common, possibly owing to the existence of the Proprietors' Labour Federation and partly to the realisation of the majority of planters that it is not necessary to pay heavy sums of money as 'silarakadan' when taking on coolies over and beyond the face value of the Tundu.

Recruiting during the year from India has been satisfactory and the new route to India *via* Talaimannar has been generally appreciated by the immigrant labourers.

The report of the Commission into labour matters in Sabaragamuwa Province has not yet been made public, if it is to be made so, but the state of affairs in and around Ratnapura which spread into the Kelani Valley has materially improved since the change of Police Magistrates at Ratnapura and Avisawella. Nevertheless there was a marked increase in the number of gangs giving notice during the early part of the season, undoubtedly the outcome of the practice having proved so remunerative to certain proctors who are reaping a harvest at the expense of the individual cooly."

It is interesting to note the way in which Estates are establishing their own hospitals in Ceylon. On this subject the Report says:—

"*Government Hospitals*, in the district are five in number, that at Kitulgalla nearing completion, and when I beg to inform you that in addition to these Government institutions there are estate private hospitals to the number of thirteen, and the construction of more pending, it may well be said that labour generally in the district receives the utmost care and attention from those responsible for the management of estates."

AYLMER Ff. MARTIN,
Director.

Bangalore,
31st January, 1916.

INDIAN POPULATION IN CROWN COLONIES AND PROTECTORATES.

The following return, compiled form the 1911 Census reports, is taken from the *Wealth of India* for July 1915. It is of interest in connexion with West Indian Immigration and the recent report on the same by the Government of India. Adults have been regarded as persons aged sixteen years and upwards. The high proportion of males to females will be noticed as a typical feature of the figures given. It is a feature which is not without considerable social and economic significance:—

British Guiana:—Total Population, 309,041, Indian, 126,517 Adult (Males 53,083, Females 34,779,)—87,862; Ceylon, Total Population, 4,110,367, Indian, 470,651; East Africa Protectorate, Total Population, 4,000,000, Indian, 11,886; Fiji Islands, Total Population, 139,541, Indian 50286, Adults (Males 20,062, Females 8,785.)—28,847; Jamaica, Total Population, 831,383, Indian Population, 17,380, Adults (Males 7,127 Females, 4,775,)—11,912.

Windward Islands:—Grenada, Total Population, 66,750, Indian, 406; St. Lucia, Total Population, 49,877, Indian, 2,064; St. Vincent, 41,877, Indian, 376.

Leeward Islands:—Antigua (with Barbuda and Redonda) Total Population 32,296, Indian, 3; Dominica, Total Population, 33,863, Indian, 8; Montserrat, Total Population, 12,196, Indian, 2; St. Christopher and Nevis, Total Population, 43,403, Indian 38; Virgin Islands, Total Population, 5,562; Malay States (Federated), Total Population, 1,036,999, Indian, 172,765, Adults (Males 116,626, Females 28,368)—144, 994; Mauritius Total Population, 377,083, Indian (a) 257,697, Adults (Males 89,996, Females 71,833)—161,829; Seychelles, Total Population, 22,691, Indian, 420; Straits Settlements, Total Population, 714,069, Indian, 82,055,; Trinidad and Tobago, Total Population, 333,552, Indian, 50,585, Adults (Males 31,989, Females 17,159)-49,148; Uganda, Total Population, 2,843,325, Indian, 1,622.—*Agricultural News.*

SCIENCE AND CIVILISATION.

(Continued.)

It is now quite difficult to find a subject that is not being studied scientifically somewhere by somebody. It is this fact which accounts for the remarkable progress of civilisation in the past half-century, and especially in the last thirty years. With rare exceptions, all important interests are pulling together for the welfare of mankind, and their efforts are effective because they are advancing over the firm foundation of scientific method. Every branch of science, every nation's literature and art, every element of "religion pure and undefiled," every element of commerce conducted upon the dignified basis of mutual respect and mutual profit of buyer and seller, is a contributor to the forward movement. It would be a pleasure to support this thesis by reference to definite contributions in many subjects, but time is available for only a few accomplishments of the past and a few needs of the future.

The discoveries in preventive and curative medicine undoubtedly rank amongst the most valued contributions to civilisation in the entire range of scientific research. I am disposed to place the names of Louis, Pasteur, Joseph Lister, and Robert Koch very high on the list of the world's great benefactors. Pasteur was a professor of chemistry whose first investigations lay in the domain of abstract chemistry, and his subsequent successes, which put the world in the way of preventing and eradicating all infectious diseases, proceeded naturally from his application of the methods of research in pure chemistry to the problems of fermentation. He proved that wine, beer, and milk ferment and turn sour because minute organisms, always present in the atmosphere, invade these liquids, multiply enormously, and corrupt them. Break the skin of the grape, the atmospheric parasites enter the wound, and fermentation develops. Exclude the air, or destroy the germs in the air, the wound in the vegetable structure remains clean and healthy indefinitely.

These discoveries by Pasteur attracted the immediate attention of Lister, who applied them in surgical operations. Antiseptic surgery, one of the most glorious works of man, is the result.

Pasteur proceeded upon the theory that just as fermentation is the work of foreign organisms, so certain diseases of animal life are the work of microbes which have entered the body of the sufferer. His first successes in preventive medicine related to cholera in the French fowls, and anthrax in the French cattle and sheep. His treatment reduced the death-rate of the fowls and animals from about 10 per cent. to fewer than 1 per cent. The great British authority, Thomas Huxley, estimated that the savings in these sources of wealth to the French nation in two decades were sufficient to pay the war indemnity of 1871. Proceeding further along the same lines, Pasteur inaugurated the curative treatment of hydrophobia. The fatalities from this horrible malady dropped suddenly from nearly 100 per cent. to fewer than 1 per cent. Do we realise that this was only thirty years ago?

In the next three decades followed the preventive and curative treatments by several renowned investigators for diphtheria, tetanus, yellow fever, malaria, spinal meningitis, typhoid fever, and other maladies. Progress has been notable in the treatment of tuberculosis, bubonic plague, cholera, typhus fever, and sleeping sickness. There are faith and hope in the future as to preventives and cures for tuberculosis, scarlet fever, measles, and cancer. The practice of extreme cleanliness and the use of anæsthetics

in surgery have enabled surgeons to reach hitherto inaccessible parts of the body, to reduce the death-rate enormously, to diminish the suffering of the patient, and to afford health and strength after healing. Wonderful operations upon the brain, upon intestines, upon severed nerves, veins and arteries are now performed. The general health of communities has been improved by the theory and practice of cleanliness and fresh air. The average length of life has increased by many years since the principles discovered by Pasteur have been applied. The increase has been greatest for children and women and those not in robust health, but it has also been great for those healthy men who have been accepted as risks by the life insurance companies. Life insurance business has been based upon mortality tables which represented the expectation of life under the relatively unhealthy conditions which existed a half-century ago. Those tables do not fit modern conditions. The number of deaths is now smaller than the insurance tables predict. This means that the actual cost of insurance is correspondingly reduced. The statistics for the saving from this source are not readily available. It can be said, however, that the increase in the duration of the lives of those healthy men who carry insurance, during the past thirty years, has meant a money saving greater in amount than all the expenditures ever made by the universities, research institutes and individuals in support of medical investigation. This reckoning does not include the saving of the lives of women and children nor take into account the economic values of the lives of the men, women, and children saved. The reckoning likewise omits the vastly greater factor of human happiness which proceeds from healthful and complete family life.

We have referred at considerable length to progress in medical science and have said that this progress followed naturally from Pasteur's investigation of fermentation as a problem in pure chemistry. We do not intend to detract in any sense or to any extent from the glory of Pasteur's work, from the glory of Lister's, Koch's, Roux's, Behring's, Ross's, Ehrlich's, and Flexner's services, when we record the simple fact that the structures which they erected and which mankind is finding of incalculable value were built upon the broad and firm foundations which the earlier investigators in biology and chemistry had made ready.

The development of the other subjects which have become so vital in modern life have essentially paralleled that of biology, chemistry, and medicine.

It is so well known as to be a trite subject that electricity was studied a full century, following Volta and Galvani, before it was seriously applied to the arts. It is not so well known that the immense value of electricity in current life, as applied by the electrical engineers, is due chiefly to the work of two men: Faraday, in the Royal Institution of London, who, studying electricity as a pure science and with no apparent thought for its possible applications, discovered the principles of magneto-electric currents, upon which all modern dynamos, and transformers, electric lighting, telephoning, and telegraphing, and the transmission of power depend; and Maxwell, of Cambridge University, who wrought Faraday's results into a foundation of complete and rigorous theory upon which future electrical engineers might build.

The X-rays and radium are the products of research in pure science, and quite regardless of so-called utility; yet what is to-day more useful than the X-rays, and what promises greater usefulness than radium and its related radio-active substances?

Pure science studies in the broad fields which we may call botany and chemistry have made scientific agriculture possible. We cannot exaggerate the importance of science in farming for the future of the human race.

A few months ago the people of the Pacific coast acquired the power of telephoning directly to Atlantic coast points. Newspaper accounts made much of the fact as a great advance, and so it was; but the newspapers left Hamlet out of the play. Improvements in the insulating system, to reduce losses of current along the line, were involved; but Bell at New York and Watson in San Francisco inaugurated the long-distance conversations by using the same transmitters and receivers which these same gentlemen had used in the beginning of telephoning, in 1876, over the line two miles long between Boston and Cambridge. The great improvements in the thirty-nine intervening years lie elsewhere in the system. It is possible for San Francisco to talk with New York and Boston, and at quite reasonable expense, because Prof. Pupin of Columbia University, as a result of systematic study, construction, and test, discovered that by placing his invention, the so-called "loading coils," at certain appropriate intervals in an electric line, thus making what electricians call a suitable balance between inductance, electrostatic capacity, and resistance, the current could be compelled to go through to its distant destination with little loss of strength. Pupin's loading coils are inserted at frequent intervals in the San Francisco-New York line. It might be possible to construct a line without the Pupin coils which would let us talk directly with New York, but the installation expenses for very large copper wires and other costly items would be so high as to impose prohibitive tolls. The happy result has been reached because the telephone company combined an exceedingly liberal and far-seeing policy with the latest discoveries in electricity as a pure and applied science: and all concerned are entitled to receive the grateful thanks of the Pacific and Atlantic peoples.

Wireless telegraphy has been a priceless servant to those whose friends go down to the sea in ships. It has averted many frightful disasters in the past decade. This branch of electricity was made possible by the researches of the lamented Hertz and others who studied the properties of electrical waves as we study the light-waves from the nebulæ—from the point of view of pure knowledge.

While the foundations of the sciences have, for the most part, been laid under the auspices of the universities and the special research institutions, it is usually the combination of men of science and successful men of affairs which makes the sciences useful to the people in general, and therefore great factors in the advancement of civilisation. To mention only one subject, electricity; we cannot compute the world's indebtedness to the pioneers, Volta and Galvani, or to the great developers of the subject, Faraday and Maxwell; but it is a fact that electricity did relatively little for mankind in general before the year 1865. The world is unable to compute its indebtedness to Edison, Bell, Marconi, and other great inventors and business men combined, who have brought electricity to everybody's house and office, to every factory to every village, to every ship as an obedient and ever-ready servant. That these gentlemen have made commercial successes of their ventures seems to have caused certain persons to lose interest in them as men of science. I have no sympathy with that point of view. Only those who have tried it can know how much courage is required to risk everything to a new venture, how many hours of day and night are given to thought of the subject from all possible angles, how unceasing must

be the maintenance of discipline in great business organisations. Not only is financial success doubly earned, and most desirable as an incentive to the succeeding generations, but financial success is absolutely synonymous with making the subject useful to mankind. It is a fortunate fact that there are Stephensons and Fultons, Edisons and Marconis, as well as Newtons and Laplaces, Darwins and Helmholtzes. The latter have laid the foundations broad and deep, but the former have erected superstructures upon these foundations which the civilised world is using every minute with great advantage. And, further, these structures, which are visible in the daily life of the people, are the incentives which lead to the provision of splendid opportunities for the extension of the foundations. The value of science as a factor in advancing the race depends at least as much upon the applied as upon the theoretical side. There can be no durable structure without the foundation, but the foundation alone, possessing wonderful potentiality, is largely a latent force. History confirms the view that real progress in civilisation is most rapid when applied knowledge is not too far behind theoretical knowledge.

The human race needs above everything else the conviction that the principles of science rule everywhere, and that the problems of personal and national life are not solved so long as any important forces are ignored. The need is especially great in our own country, where isolation from other countries and the existence of immense reservoirs of natural resources have let us seem to keep up with international progress in spite of our wasteful and inefficient methods. It were well to recognise that entry upon world affairs, which we cannot long avoid, will reveal costly weaknesses.

The appeal of science for the adoption of scientific methods in the daily life of the people, in the governments of community, State and nation, in the settling of international questions, is not an appeal for efficiency at all costs. The life that is for ever bent over the exact equation, two plus two are four, a life that tries to express all its experiences in equations equally exact, is liable to be narrow, distorted, unhappy, and misspent. The man who worships scientific efficiency, like the man who is a slave to gold, or the man who pushes his religion too far, may acquire a harsh and selfish view of life ; pity and charity may drop out of his vocabulary.

Our appeal is for the scientific method of treating the problems which are before us for solution. The scientific method is that which takes account of all the forces acting. It is therefore the just method. It is in full harmony with the golden rule, "Do unto others as you would have others do unto you." It is, if you please, in full harmony with the spirit of Christ. Support is given to research by the Governments and by generous men and women in order that the truth may be found and be made available in the service of mankind. The investigational laboratories of the universities, the observatories, the private institutions for research, have precisely these ideal purposes, and no other purpose. The various activities of the world contribute to the advancement of civilisation in proportion as they contain the ideal and the unselfish. That which is purely practical, containing no element of idealism, may sustain existence and to that extent be valuable, but it does not civilise. I believe it is the idealism of pure knowledge, the idealism in applied knowledge, the idealism in industry and commerce, the idealism in literature and art, the idealism in personal religion, which leavens the life of the world and pushes forward the boundaries of civilisation.—*Nature.*

The Planters' Chronicle.

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THE U. P. A. S. I.

(INCORPORATED.)

Contents.

We publish the proceedings of the Annual General Meeting of the Mundakayam Planters' Association; also the Annual General Meeting of the Nilgiri Planters' Association, and the Annual General Meeting of the Central Travancore Planters' Association. It will be seen that the whole of the present issue is taken up with the reports of the District Associations.

We are holding over, consequently, some letters that have reached us from some of our Planter—soldiers at the front which we hope to find space for next week.

The Director of the Labour Department has returned from a short visit to the Hassan District.

The Scientific Officer is still at Pusa but will probably return to Headquarters next week.

It will be remembered that at the last Annual General Meeting of the U. P. A. S. I., it was generally desired that Chartered Accountants should be employed to audit the Accounts of the U. P. A. Members will be glad to hear that on the application of the Chairman, the Madras Government have appointed Messrs. Fraser & Ross, Chartered Accountants, Madras, auditors for the current year.

SOUTH INDIA PLANTERS' WAR FUND.

	Rs.	A.	P.
Amount previously acknowledged	34,400	11	0
"A bet R. R. and J. S."	20	0	0
"The High Range One Day's pay a month Fund"...	760	0	0
The Billiard Room of the Ootacamund Club ...	300	0	0
Mr. L. F. Lake	50	0	0
Mr. H. Clifton Leslie	10	0	0
Mr. C. S. Prince	50	0	0
"A. D. C. Bombay"	5	0	0
Mr. D. V. Crowe	7	8	0
Total Rs...	35,603	3	0

OVERSEAS AIR CRAFT FUND.

Amount previously subscribed ...	4,483	14	0
Total Rs...	4,483	14	0

DISTRICT PLANTERS' ASSOCIATIONS.

Mundakayam Planters' Association.

Proceedings of Annual General Meeting of the Mundakayam Planters' Association, held at the Mundakayam Club, on Saturday, the 15th January, 1916.

PRESENT.—Messrs. J. J. Murphy (Chairman), R. Harley, H. M. E. Howson, Wm. Hendry, S. P. Eaton, H. B. Kirk, F. Simmons, N. D. Pullock, P. Napier, J. S. McKill, H. Macpherson, T. H. Fitchett, W. F. Stephen, E. Vincent, and G. West (Honorary Secretary) and by proxy Messrs. G. H. Danvers and J. R. Vincent.

1. MINUTES.—The Minute of last Meeting were taken as read and approved.

HONORARY SECRETARY'S REPORT.

Mr. Chairman and Gentlemen,

I have again the pleasure and privilege submitting to you another annual secretarial report *i.e.*, for 1915. That year like the previous one, is marked by a continuation of hostilities in Europe and elsewhere, the effects of which are felt by us even here. That the patriotic spirit of those of us who have been left behind is alive, will be known later on from my report when I make reference to the generous support which various War Funds have received at the hands of the Planters of Mundakayam District. As recorded at a previous Meeting, we had to regret the loss of a previous Honorary Secretary in Capt. R. C. Milbank, but apart from this there has been no fatality amongst the members of this Association who gallantly threw every other consideration aside and went to take up arms when their King and Country called them. This Association has not forgotten these men, and through the instrumentality of Mr. Kirk, a cigarette Fund was inaugurated during the year for their benefit. I trust that all members are still keeping this Fund in mind.

During the past year, the acreage under Rubber was 11,792,49, under Tea 855.36 and under Rubber and Tea interplanted 45, making a total of 12,692,85 as against 12,717.47 for the previous year. As formerly, all subscriptions to the Association for the past year have been fully paid at the rate of 3 Annas per acre from Estates; and in addition to this we had subscriptions of Rs. 10 each from 3 private members. The contributions to the Planters' Benevolent Fund have been somewhat lower than that of the previous year, but this is readily accounted for by the number of our members who have gone to the Front, and also by the number of praiseworthy calls which have been made upon and met by those who have been left to foot the bill. I am, however, quite sure that in normal circumstances, this Fund will receive the usual generous support of all of you. During the year, an additional sum of Rs. 145 has been contributed to the Imperial War Fund making a grand total of Rs. 2,028-9-0

Another Fund, however, and one of which you will agree with me appeals more directly to us all, was inaugurated by our Chairman at the last Annual Meeting of the U. P. A. S. I. I refer to the South Indian Planters' War Fund, and I have much pleasure in announcing that to date I have received subscriptions for this to the amount of Rs. 1,255, and an additional sum of Rs. 1,320 has been promised and will in due course be

paid by the various members of this Association. You will observe, gentlemen, from what I have stated that calls upon members in various ways have been many, but the response has been equally great. I venture to add that even yet our resources in this respect are not altogether exhausted.

Throughout the year under review, you will readily gather that a considerable increment of work fell upon the officials of the Association, even in respect to the above matters alone, but considering the cause, I am sure that the task of others must have been as pleasant as my own. We had the usual number of general Meetings of the Association throughout the year and these were very well attended indeed, which betokened a lively interest in the affairs of our Planting Community. About the middle of last year, a deputation of members of your Association met the Dewan and represented to him the necessity for the formation of a "Town Improvement Committee" for Mundakayam. The Dewan received the idea favourably and although nothing has so far been done in this matter, I feel sure that His Highness' Government will take steps with regard to this in due course.

Although the question of Cattle Pound for Mundakayam has been so often before you, I am constrained to refer to it once more and I trust for the last time, as I have the pleasure to inform you that this building has now been satisfactorily completed, thanks to the efforts of Mr. Harley, who has handed the building over to me on behalf of the Association. The cost of the Pound was Rs. 383.

In spite of what I stated in my report at the last Annual Meeting of this Association with regard to Kodimatha Landing Stage, I regret to say that the Government have done nothing so far in regard to the carrying out of this much-needed improvement, and as your representative member of the Sri Mulam Popular Assembly, I shall draw the Government's attention to their dilatoriness in the commencement and execution of this work. As I already reported, the Government stated that they hoped that the work would be completed before last monsoon. In a few months we shall have another monsoon!

Our sincerest thanks are due to our Chairman, Mr. Murphy and to Mr. Asher for having so ably represented this Association at the annual Meeting of the U. P. A. S. I. and the Sri Mulam Popular Assembly respectively. As you are aware, Mr. Asher kindly consented almost at the last moment to take the place of Mr. Hamond (who was unavoidably prevented from attending) at the latter Assembly. You will have the Proceedings of the last General Meeting of the U. P. A. S. I. and I cannot but refer to the masterly way in which Mr. Murphy upheld the interests of our Association, and also to the eloquent appeal which he made for the formation of the "South Indian Planters' War Fund" to which I have already made reference.

In December last, we had the pleasure of a visit from Mr. Anstead. While in this neighbourhood he kindly gave us an instructive lecture dealing with manures, cultivations etc., and I am sure we shall welcome Mr. Anstead back again when he has the opportunity to visit the District. It is needless for me to point out that this is one of the benefits which we derive from the Scientific Department of the U. P. A. S. I.

While submitting my resigning to you, gentlemen, permit me to say that my work during the past year has been rendered easy and pleasant on account of the generous assistance which I have received from our Chair-

man and other members of the Committee, and to them I render my sincerest thanks. As I shall shortly be proceeding home on leave, I regret that I shall be unable to take any active part in the work of the Association during this year. I give my thanks to everybody for the consideration they have given me in my endeavours to fulfil my duties as an official of this Association.

CHAIRMANS' SPEECH.

Gentlemen,

At our last Meeting it was resolved that the Commissioner, Mr. Robinson, be asked to receive a deputation with reference to the proposed "Town Improvement Committee." He was expected to visit Mundakayam about then, but his tour was postponed, and I do not know when he will come. My own views to some extent altered and I do not think that Estates should be asked to meet the cost of keeping Mundakayam town in a sanitary condition. It is clearly the duty of Government to look after the public health, and, if the matter be brought to the notice of the Dewan, I feel convinced that the Travancore Government, anxious as it always is for the welfare of the people, will do whatever may be necessary.

Although we had in 1915 about the heaviest rainfall on record, rubber yield showed great improvement compared with previous years. I have not got complete figures for the district so cannot give you much information. Vellanadi gave 305 lbs. per acre from its 1904 rubber and 268 lbs. per acre from its 1905 and 1906 planting. From Boyce 1907 clearings (daily tapped from two months only), 220 lbs. per acre were obtained. I do not think that we need be in the least bit despondent about yields. If they have not in full case come up to expectations in the past, it is chiefly, as I have written in a letter which will shortly appear in the *Planters' Chronicle*, owing to our having had too many weeds in early days, to our having planted our estates too closely and to our having on most estates wasted bark. Now with weeds only an unpleasant memory, with a reasonable number of trees per acre, and with tapping, if not quite perfect, at any rate second to none, the flow of latex is everywhere increasing and 1916 prospects are of the best.

Of Labour all I need say is that Labour troubles are almost unknown amongst us. Coolies were most plentiful in 1915 and we all had to refuse work to many. So far as I know advances are kept at a reasonable level and practically no bad debts are being made. We passed a resolution at our last Meeting asking the U. P. A. Council to consider if Government should be asked to hold an enquiry into the conditions under which Estate labour is employed as certain charges had been published against us. I understand that the Council decided that an enquiry is uncalled for as the accusations against planters were made by irresponsible agitators.

I think, gentlemen, that this year the position of the U. P. A. as regards Travancore Associations should be considered. I thought, and still think that our grievances with reference to the new land regulations should be laid before the parent Association and that it should take action in the matter. I wrote this to Mr. Richardson, who as you know is well up in all association rules and customs, but he replied that the U. P. A. could not interfere until all local means of redress had been tried. I do not agree with him. If it were merely a grievance of one association it would be a different thing, but in this case all Travancore Associations are concerned, and the proper medium through which Government should be approached is undoubtedly the United Planters' Association. If it, because it is only registered in British India, cannot approach the Travancore Government the sooner it is also registered in Travancore the better.

Other matters such as freights and cart licenses will come up for discussion later on, so I shall not deal with them now, but before I sit down I am sure you will expect me to say a few words on the subject which above all has occupied our thoughts during the past eighteen months.

I do not suppose there is a man here who does not regret not being able to do his bit in the trenches, who, no matter how valid his reasons for remaining here may be, does not feel uncomfortable and ashamed when he thinks that others are cheerfully enduring all sorts of discomforts, and are risking their lives daily for the Empire, while he is unable to do his fair share for what we should all look on as a sacred cause. There are, however, various ways in which we can help even though unable to join the Army, and we should ask ourselves if we have done in the past as much as we might have done. If the answer is "No," let us then resolve to do better this year. I was asked some time ago if I thought men should give everything they can save to War Funds. Of course they cannot be expected to do so. They have in most cases to invest their savings so as to provide for their families but they can do this by investing in one of the War Loans thus helping the Empire on, let me add, very advantageous terms for themselves. I know of course no more of the progress of the war than you do and no words of mine are required to put hope in your hearts. Hope! Hope is not needed.

Certain as it is that day follows night, just so certain is it that the end will be a smashing and decisive victory for the British Empire and its brave Allies. Though the latest news is good, we may still have to read of reverses, or of what to our untrained civilian minds may appear to be reverses, but, no matter how black things may have looked in the past, no matter how gloomy the situation may at any future time appear, the answer to the question "Are we down hearted?" shouted by our gallant soldiers as, in the first month of the war, they marched through Boulogne to what was for so many of them a glorious death in the everlastingly famous retreat from Mons, remains the same, and ever will remain the same so long as the British Isles exist.

I feel deeply, we all feel deeply about this war, and I can find no more fitting words with which to close my remarks, no better words with which to end my final address as your Chairman, than words the true significance of which we now only perhaps thoroughly realize.....God save the Empire! God save the KING!

4. AUDITOR'S REPORT.—The Auditor Mr. Howson, stated that he had examined the Books of the Association for the past year, and that he had found same correct. He, however, suggested that different system of keeping the Books should be adopted in future.

5. RUBBER GROWERS' ASSOCIATION AND TRAVANCORE COMBINED PLANTERS' ASSOCIATION.—Mr. Howson read very full and interesting reports of the recent Meetings of the above Association. After the reports had been fully considered in Committee, the following resolution from the Chair was adopted "That the Combined Travancore Planters' Association be asked to request the U.P.A.S.I. to approach the Travancore Government with reference to the recent new rules regarding Land Purchase which as they now stand must put a stop to all planting enterprises in the State."

A unanimous vote of thanks to Mr. Howson for having kindly acted as Delegate was passed.

6. H. E. THE GOVERNOR'S VISIT.—Correspondence with reference to this was laid on the table, and, on the proposal of the Chairman, it was decided that the arrangements to be made for the visit should be left in the hands of the Committee.

7. CATTLE POUND.—Mr. Harley intimated that the Cattle Pound had now been completed, and he handed the key over to the Association. A hearty vote of thanks was accorded to Mr. Harley for the trouble he had taken in the erection of the building.

8. SHIPPING FREIGHTS.—This question which was raised by Mr. Kirk was discussed in Committee, and after the matter had been fully gone into, the Honorary Secretary was instructed to write to the Chambers of Commerce at Alleppey and Cochin for certain information. The meeting then approved of the following resolution proposed by the Chairman "that the attention of the Travancore Government be invited to the very serious shortage of tonnage from West Coasts ports, and that it be asked to approach Imperial Government on the subject with a view to arrangements being made for additional steamers to load in our harbours."

9. ANNUAL SUBSCRIPTION FOR 1916.—On the motion of the Chairman it was agreed that this remains the same as for the previous year.

10. DATE OF ANNUAL GENERAL MEETING.—The Chairman after reading a letter from Mr. Danvers Davy asking if the rule fixing the Annual General Meeting for a day in February had been cancelled, said that the rule referred to by Mr. Davy was not included in the Revised Rules passed in 1915 and was therefore no longer in force. Mr. Vincent said that he thought the old rule again be adopted and proposed a resolution dealing with this, but it was not accepted by the Chairman as no notice had been given. Mr. Vincent then gave notice that he would submit a resolution at the next General Meeting.

11. ELECTION OF OFFICE BEARERS.—The following office bearers for 1916 were then elected:—

Chairman	...	H. M. E. Howson, Esq.
Vice-Chairman	...	H. B. Kirk, Esq.
Honorary Secretary	...	S. P. Eaton, Esq.
Committee	...	Messrs. E. E. Evre, Wm. Hendry, R. Harley, and A. Hamond.

A hearty vote of thanks to the retiring Chairman proposed by Mr. Kirk and seconded by Mr. Eaton was unanimously carried.

Mr. Murphy thanked Mr. Kirk for his kind remarks and Members for the cordial way in which they passed the vote of thanks, and said it had been a great pleasure to him to act as Chairman. He then proposed a vote of thanks to Mr. West for the excellent work he had done as Honorary Secretary. Mr. West having briefly replied, the date of next Meeting was fixed for 8th April, 1916, and the proceedings then closed.

(Signed) H. M. E. HOWSON,
Chairman.

(„) S. P. EATON,
Honorary Secretary.

Nilgiri Planters' Association

Proceedings of Annual General Meeting of the Nilgiri Planters' Association, held at the Collector's Office, Ootacamund, on Monday, 17th January 1916.

PRESENT.—Mr. J. S. Nicolls, Chairman, Mr. L. A. Gerrard Rogers, Honorary Secretary, the Hon'ble Mr. E. F. Barber, Messrs. Rhodes James, James Stanes, W. Moir, R. N. C. Grove, A. S. Dandison, W. C. Deane, E. S. Clarke, S. Rowson, C. Gray, P. Beaver, G. Oakes, W. A. Cherry, A. K. W. Downing, J. B. Leslie-Rogers, W. B. D'Courcy, R. Bake, C. L. Egan, J. B. Vernede and N. J. Stanes.

Proxies.—Messrs. Bayly and Brock, Limited, and A. G. Nicholson.

Visitors.—Messrs. E. H. F. Day, Kirwan and Minchin.

157. Proceedings of last meeting were taken as read.

158.

HONORARY SECRETARY'S REPORT.

Mr. Chairman and Gentlemen,—I beg to submit the Annual Report and Accounts for the year ending 31st December, 1915.

I took over the Honorary Secretaryship from Mr. Church last February. There have been three General Meetings in 1915 and I have issued circulars to members on all important matters which came up between meetings. The average attendance was fifteen members, so there is room for much improvement in this respect.

ACREAGES.—During the past year two estates have left the Association representing 802 acres, leaving 16,621 acres subscribing to the Association. I am pleased to report that new acreages totalling 556 have been promised for 1916. Of 16,621 acres last year, 7,622 were under Tea, 8,748 Coffee, 221 Rubber and other produce 30. Two new members were elected as Personal Members.

ACCOUNTS.—These are on the table before you and have been audited by one of your members. They show a balance to the credit of the Association of Rs. 1,158-9-0 out of which a sum of Rs.519-6-6 is due to the U. P. A. S. I., being ¼ of our annual subscription due in May, and Rs. 37-3-0 which has been paid on account of 1916 subscriptions. This leaves us a balance of Rs.601-15-6 for the current year's expenses, an increase over last year's balance of Rs. 135-3-9.

S. I. P. B. FUND.—Rs. 195-0-0 was subscribed to this fund last year. I hope that these subscriptions will be continued and that some new subscribers will come in in 1916. One of our members received assistance from the Fund in 1915.

S. I. P. WAR FUND.—Most of the subscriptions were sent direct to the Secretary, U. P. A. S. I., the names being published weekly in the *Chronicle*, as also were the subscriptions to the Aeroplane Fund.

LABOR DEPARTMENT.—This has now been in operation over a year and judging from the report of the Director, the initial year has been a successful one.

SCIENTIFIC DEPARTMENT.—Our Delegates were instructed to support the new scheme proposed by Government and those of you who read their report will see that it is hoped that the new scheme will come into operations at no distant date.

SERVICE OF WARRANTS.—I sent all members copies of D. S. P's Circular, with a letter asking for opinion or suggestions about the same. I received some half dozen replies. Those containing any suggested alterations I will submit to the D. S. P. The subject is on the Agenda today and some further information may be forthcoming.

CROPS.—The rainfall has been exceptionally heavy on the upper plateau. Tea yields have been above the average on the majority of estates. Coffee crops were poor owing to unfavourable weather for blossoms early in the year.

RUBBER.—There are only a few estates producing rubber, on some the crops have exceeded estimates. With regard to the second leaf fall of rubber I have not received intimation of this appearing on any Nilgiri estates. It is to be hoped that it will not appear on the Nilgiris. Any seed imported from other Districts should be fumigated or otherwise treated. This brings me to the subject of the Pest Act.

THE PEST ACT.—A copy of the Draft of the Bill is before the Meeting when you will be able to express an opinion on it. Planters have been trying to get a Pest Act for 5 years and it has now been drafted. Before closing my remarks I should like to thank our Chairman for his valuable help and advice to me during my term of office.

CHAIRMAN'S ADDRESS.

Gentlemen :

Since I last had the honour of addressing you from the chair, another year of this dreadful and barbarous war has passed, we are all being called on to fulfill our duty towards our country, and I feel certain we all wish to be facing the enemy, not only of our country but of humanity. Age and ill-health prevents some of us, others have responsibilities which our Empire would not wish us to throw off. We cannot all go and fight, but we can all do our duty. *You have heard* your Honorary Secretary's report and the accounts are before you.

Tea prices have been abnormally high, but I for one feel certain such prices cannot continue. Coffee, I regret to say, has not benefitted in the same way.

Subscribing Acreage is less than it was last year. This is to be regretted. There is still a large acreage on the Nilgiris, not on our list, the Hon'ble Mr. Barber in his speech from the chair at your Annual meeting of 1914, said the total area of planting on the Nilgiris was estimated at 30,000 acres. Who owns the 14,000 acres not subscribing? Gentleman, show them the evil of their ways.

ACCOUNTS.—Your Honorary Secretary is to be congratulated on the satisfactory cash balance shown; as far as finance is concerned the Association is in a sound position.

S. I. P. WAR FUND.—"We cannot all go to fight, but we can all do our duty" and I think it ought to be our aim and object to so support this fund, that it will not only suffice to give temporary relief, but will allow funds being invested for the benefit of those whom our brother planters that fall on the field of honour might leave behind them. Their children we must look on as our own, and be prepared, if necessary, to educate them and bring them up to woman or manhood. The fund now amounts to about £2,000. We cannot feel proud of what we have done so far. To those who have not given I would ask to delay no longer. I hope all Superintendents and Assistants will at least give one day's pay a month, and that all proprietors, agents, and connected firms will liberally support the efforts of the "Workman planter."

S. I. P. B. F.—This is worthy of greater support. Rs. 195 from the Nilgiris does not sound enough.

FREIGHTS.—At our meeting of 26th August 1914, I brought to your notice that freights had gone up 30 per cent. The position is worse now. The following is a quotation from Calicut by direct line.

January 87/6.

February 97/6.

And it is clearly evident that if we want to get all the space we require higher rates than this will have to be faced.

A fortnight ago the rate for wheat flour from the River Plate to the United Kingdom was 125 shillings, and the same rate for rice from Burma to the United Kingdom. These for full cargoes, naturally more attractive to Steam-ship Companies, so if we want to get our produce home, we must, I fear, be prepared to pay competitive rates. Up to the end of November we have had little to complain of as regards shipping facilities on the west coast. The Clan Line has treated us very wel lbut the second steamer for December was withdrawn and the coast engagement in this was 4,000 tons. The application for January was 12,500 tons, thus making requirements to the end of January of 16,500 tons. For this we are getting one direct steamer, the Clan MacKinnon, due about the 25th instant, with available space for 4,000 tons. The causes for this are many; requirements from wheat producing countries, submarining of steamers, requisitioning by Government, but real cause is that there are insufficient steamers to go round. It is therefore regrettable that the prize vessels which appear on the list, and have appeared for over a year past as in Bombay Harbour, are not made use of.

Those vessels would carry at the very lowest estimate between them 70 to 80,000 tons.

A new feature which is hitting the West Coast shipping has now arisen—the requisitioning by Government of steamers in eastern waters—to carry their own purchase of wheat and barley from Karachi. They must of course have steamers for this purpose, and I would be the last to wish that any words of mine should be construed as unpatriotic but the proper place for them to engage steamers is in the open Market, in London and in competition with everyone else. When they requisition steamers in the Eastern waters, it means at a moment's notice they are taking away steamers which have come out to the East under contract to private parties, thus taking away freight from others who have bid for it.

The Clan line in particular, I believe, are suffering very much from requisitioning of their steamers by Government, and also they have been particularly hard hit through submarines, and I see from the newspapers that the Clan Macfarlane, which was to have been our first Steamer from the Coast in February has been submarined. As I have before remarked, the Clan Line has done us well. I think we ought to do all we can to help them. It is essential in Imperial interests that the planting produce of Southern India should be shipped promptly.

LABOUR DEPARTMENT.—Mr. Day, the Deputy Director, is to be with us to-day, and it is proposed after the general meeting to hold a meeting of subscribers.

You have a long, and important agenda before you so I will not occupy your time any longer. And now, thanking you for the attention you have always given me at your meetings in the past year, and your Honorary Secretary for the keen interest he has taken in forwarding the welfare of this Association.

A vote of thanks to the Chairman and Honorary Secretary for their services in the past year, proposed by Mr. A. K. W. Downing and seconded by Mr. Rhodes James, was carried unanimously.

159. U. P. A. S. I. Circulars.

(*a*) "Conditions under which labour is employed on estates.

Read copy of letter from Mundakayam Planters' Association.
" letter from J. S. Nicolls to Secretary United Planters' Association, Southern India.
" Wynaad Planters' Association Resolution.
" Copy of letter from Coorg Planters' Association.

The following resolution was proposed by Mr. A. S. Dandison and seconded by Mr. E. S. Clarke.

"That this Association decline to support the Mundakayam resolution and is unwilling to afford Mr. Srneevasa Mudaliar the cheap notoriety he is seeking."—Carried unanimously.

(*b*) COCHIN-SHORANUR RAILWAY.—Correspondence read and recorded. The Honorary Secretary was instructed to circularise members with a view to ascertaining the prospective traffic returns.

(*c*) TEA SEED FREIGHT.—Read and recorded. Copy of letter from General Traffic Manager, South Indian Railway, to Secretary, U. P. A. S. I.

Members were requested to advise the Honorary Secretary of any delay in delivery of tea seed.

160. SMALL FOREST RESERVES.—Mr. James Stanes opened the discussion on this subject. Several members spoke in support of it, and letters from the Honorary Secretary Wynaad Planters' Association and Mr. A. G. Nicholson were read. The following resolution, proposed by Mr. James Stanes and seconded by Mr. Cherry, was carried unanimously.

"Resolved that Government be requested to grant leases of certain portions of Forest Reserves which cut into existing estates and further that in granting such leases they give preference to those estates on which such portions of Reserved Forest abut." Proposed that the Hon'ble Mr. E. F. Barber be asked to take up this Resolution before Government."

The Honorary Secretary was instructed to write and thank the Wynaad Planters' Association for their letter offering to support any resolution sent up to Government by the Nilgiri Planters' Association.

161. PEST ACT.—The copy of the draft of the Act was read by the Chairman, when an animated discussion took place.

The following resolution was proposed by Mr. Rhodes James and seconded by Mr. Deane. "This meeting considers that in view of the drastic and expensive measures which the Pest Act proposes to enforce on Planters it is a *sine qua non* of our acceptance of the Act that it should be

equally enforced on "Government Forest and Waste lands, otherwise Planters will be reinfected again from Government Lands after being put to considerable expense, and that Government be asked to favour this Association with their reply to this."

The following amendment, proposed by Mr. P. Beaver and seconded by Mr. G. Oakes, was put to the meeting and was carried. For the amendment 18, against 4, including proxies.

"Resolved that this Association is prepared to accept the Pest Act proposed by Government and hopes that Government will specially guard against diseases or pests by making Forest Lands nurseries or sanctuaries for said pests."

162 SERVICE OF WARRANTS ON ESTATES.—Letter from the District Superintendent of Police, read and recorded.

163. BEAT CONSTABLES.—District Superintendent of Police's letter of 17th November 1915 re. signatures in constables' beat books. Read and recorded.

Proposed by Mr. Deane and seconded by Mr. Rhodes James that the D. S. P. be thanked for this letter drawing attention to the matter the Honorary Secretary being accordingly instructed.

164. FREIGHTS.—The following resolution proposed by Mr. G. Oakes and seconded by Mr. E. S. Clarke, was carried unanimously.

"That this Association supports the views of the Chambers of Commerce regarding Freight from India."

165. Read letter from Honorary Secretary Wynaad Planters' Association.

Proposed from the chair that half the cost of Mr. E. R. Osborne's fees be paid from the Nilgiri Planters' Association Funds. Carried unanimously.

The Honorary Secretary was instructed to pay that amount to the Honorary Secretary, Wynaad Planters' Association.

166. NEW MEMBERS.—Messrs. Keith West and Norman Stanes, proposed from the chair, were duly elected.

167. ELECTION OF OFFICE BEARERS.—The election of office bearers for 1916 resulted as follows:—

Mr. J. S. Nicolls, Chairman; Mr. A. S. Dandison, Vice-Chairman, Mr. L. A. Gerrard Rogers, Honorary Secretary.

COMMITTEE.—Messrs. W. A. Cherry, E. S. Clarke, A. K. W. Downing, J. S. Pascoe, James Stanes and G. Oakes.

Read letter from the Collector regretting inability to attend the meeting. Recorded with regret.

With a vote of thanks to the Chairman and to the Collector for the use of the room, the meeting closed.

(Signed) J. S. NICOLLS,
Chairman,

(„) L. A. GERRARD ROGERS.
Honorary Secretary.

Central Travancore Planters' Association.

Proceedings of the Annual General Meeting of this Association held at Glenmary Bungalow, on Saturday, 22nd January 1916, at 10 a.m.

PRESENT.—Messers. H. C. Westaway (Chairman), W. H. G. Leahy (Vice-Chairman), F. Bissett, J. A. Richardson, J. S. Wilkie, W. A. J. Milner, J. M. Wilkie, A. R. St. George, R. Tait, C. A. Mackenzie, F. W. Winterbotham, T. C. Forbes (*by proxy*) and R. P. Rossier (Honorary Secretary).

The Notice calling the meeting was read.

The Proceedings of the last Meeting were taken as read and confirmed.

CHAIRMAN'S ADDRESS.—Gentlemen, I see that I am put down for an address but will not detain you long as the Honorary has I think, mentioned everything in his Report, which he will read you in a minute.

TEA MARKET.—Prices have been very good up to about 3 months ago, when there was a serious drop, but I am glad to see from the latest telegram from home that the market has quite recovered, and from what one reads prices are likely to keep up.

Profits for the year should be good, but not so large as we I think at one time thought they would be, owing to the great rise in freights.

FREIGHTS.—As you know these have gone up by leaps and bounds, and I now understand that they are to be increased by 30 shillings per ton from the 15th March which carries them to an almost prohibitive figure. All the same we should I think be very thankful that we are able to send any tea home at all, and it is only owing to the British Navy that we are able to do so.

TEA THEFTS.—These have been discussed at nearly every meeting but I am now glad to say that a Committee has been formed and it is hoped that they will be able to formulate some scheme whereby they will be reduced if not entirely done away with. I think they have undoubtedly been less lately, due no doubt to the deterrent punishment meted out to the thieves when caught.

LABOUR.—This although coming up very late has I think been ample. This gentleman is I think all I need touch on, but before concluding I would like to place on record my thanks to the Honorary Secretary for all the work he has done. He has had a particularly busy time of it especially with the number of subscription lists and other circulars he has had to issue, and I am sure the Association is under a great debt of gratitude to him for all he has done. I might mention that this is the 4th year he has had of it.

I thank you all for your support, and the Committee and the Honorary Secretary for their advice and assistance and now place my resignation in your hands.—Applause.

HONORARY SECRETARY'S REPORT.

Mr. Chairman and Gentlemen,

During the year under review we have held four General Meetings and five Committee Meetings.

LABOUR RULES.—The same rules as existed were carried on during the year.

ROADS.—The Travancore Government are I understand now doing work on the Sircar road on different sections. It is hoped however, that they will not spare expense on parts of the Kottayam Kumili Road as some sections are in a most disgraceful condition. Government are ready to condemn us when things are wrong on our District roads, but I am certain that we never leave our roads go back to such deplorable conditions as some parts of the Sircar roads.

Regarding our own roads these have improved during the last year but we still hope for improvement.

WAR SUBSCRIPTIONS.—Details of the subscriptions made during the year are laid on the table.

MEMBERSHIP.—The Association consists of 15 Members. Cheenthalaar Estate and Messrs. Peirce Leslie & Co., Ltd., have joined during the year. To-day we have further applications for Membership to put before the Meeting.

CROPS.—The crop for 1915 for Estates in the Association is 3,832,290 lbs. made Tea from an acreage of 6,008 acres in plucking or an average of 637 lbs. per acre, against a crop of 3,485,399 lbs. made tea from 5,657 acres in 1914.

The total for the District is for 1915, 6,785,018 lbs. made Tea from 10,955 acres or an average of 619 lbs. per acre. I still have to get the returns from one Estate.

ACCOUNTS.—Mr. Milner kindly audited the accounts and I lay these on the table.

This gentleman finishes my report. I take this opportunity of thanking the Chairman and Committee for the assistance they have given me during the year and you, gentlemen for having elected me as your Honorary Secretary. I have had the honour of having been elected by you on four consecutive occasions and I can assure you I appreciate this honour very much. I now beg to tender my resignation.—Applause.

CORRESPONDENCE.—All correspondence since the previous Meeting was read.

MAI MALLAY TEA THEFTS CASE.—Proposed by Mr. Winterbotham :—

"That a watch be given to the Sub-Inspector of Police Kottayam, Mr. "Subramonia Pillay, in recognition of services rendered in the Mai Mallay "Tea Thefts Case."

Seconded by Mr. Richardson and carried.

Proposed by Mr. Wilkie and seconded by Mr. Richardson :—

"That this Association support the Mundakayam P. A. in their resolution to Government regarding the shortage of tonnage and that the Honorary Secretary do write to the Dewan on the subject" carried.

Circular Letter, U. P. A. S. I. No. 18/16 was read with Resolution regarding "Conditions under which Labour is employed on Estates" and the Honorary Secretary was instructed to inform the Secretary, U.P.A.S.I. that this Association is opposed to the Resolution.

FINANCE AND SUBSCRIPTIONS.—The Accounts for 1915 were passed.

Proposed by Mr. Richardson :—

"That the subscription for 1916 be at the rate of 3 annas per acre" seconded by Mr. Leahy.—Carried.

LABOUR RULES AND RATES.—Proposed by Mr. Bisset :—

"That the existing Rules and Rates be carried on for another period of one year. Seconded by Mr. Roissier.—Carried.

ELECTION OF NEW MEMBERS.—The Honorary Secretary read letters received with application for Membership of this Association from the Superintendents of Wallardie Estate, Chankara Estate, and Moongalar Estate.

Proposed By Mr. Richardson that.—"These Estates be elected as Members of this Association." Seconded by Mr. Leahy. Carried unanimously with applause.

RESOLUTION BY MR. MACKENZIE.—It was proposed by Mr. Mackenzie:—"That Rules 4 & 5 of the Central Travancore Planters' Association be altered to read as follows:—

"Rule 4. That the Committee consist of not more than five Members namely the Chairman and Secretary (ex-officio) and three Members of the Committee one of whom shall be the Vice-Chairman."

"Rule 5. That one unofficial Member shall retire from the Committee annually in rotation and not be eligible for election for one year and that in event of a Chairman and Secretary being appointed, who are already Members of the Committee, that their places be filled at once and that of the gentlemen elected the one who shall receive the lowest number of votes be the first to retire." Seconded by Mr. Winterbotham.

An amendment was proposed by Mr. Tait and seconded by Mr. Wilkie:—"That all the executive Members of the Association retire annually and are re-eligible for election."

Mr. Mackenzie having withdrawn his resolution the amendment was carried.

PROPOSED BY MR. LEAHY.—"That a Committee be formed to revise the C. T P. A. Book of Rules and cost to be met by the Association Funds. The Committee to consist of Messrs. Bissett, Richardson and the Honorary Secretary" seconded by Mr. Roissier and carried.

FITTER AND FORGE.—Proposed by Mr. Bissett "That this Association give the Fitter and Forge Committee the power to wind up the Fitter and Forge Fund." Seconded by Mr. Wilkie, carried.

ELECTION OF OFFICE BEARERS FOR 1916.—The ballot having been taken, the following were elected as office bearers for 1916.

Chairman	...	Mr. Bissett.
Vice-Chairman	...	Mr. J. S. Wilkie.
Honorary Secretary	...	Mr. Milner.
Committee	...	Mr. Westaway, Mr. Knight.

Mr. Roissier was elected an Honorary Member of the Committee.

Mr. Winterbotham proposed a vote of thanks to Mr. Richardson our Planting Member of Council, Travancore, for all he has done for the Planters during the year. Carried with applause.

Mr. Bissett thanked the Members for electing him as Chairman and Mr. Milner also thanked the Members for electing him as Honorary Secretary.

Mr. Leahy addressed the Meeting and said:—

"Gentlemen,—I have great pleasure in proposing a very hearty vote of thanks to our retiring Chairman and Honorary Secretary. It has been an arduous year for them both and I am sure they deserve our best thanks for the way the work has been done. Mr. Roissier has been Honorary Secretary for four years which is a record in itself but leaves a record of most excellent work done for us and we are the more indebted to him." Seconded by Mr. Winterbotham and carried with applause.

The Chairman proposed a hearty vote of thanks to Mr. Wilkie for having kindly placed his bungalow at the disposal of the Meeting.

With a vote of thanks to the Chair, the Meeting terminated.

(Signed) REGINALD P. ROISSIER,
Honorary Secretary.

The Planters' Chronicle.

RECOGNISED AS THE OFFICIAL ORGAN OF THE U. P. A. S. I., INCORPORATED.

(Secretary's Registered Telegraphic Address "Planting," Bangalore.)

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THE U. P. A. S. I.

(INCORPORATED.)

Contents.

The Scientific Officer returned to Head-quarters from Pusa on the 17th.

We publish the Proceedings of the South Travancore Planters' Association and those of the Bababudin Planters' Association.

In our Correspondence columns will be found some letters from some Planter-soldiers at the front.

The Director of the Labour Department asks us to publish the following:—

"Mr. W. G. F. Walters took charge of the Chinglepat Division on 15th February.

Subscribers to the Department are requested to address all letters on labour matters connected with the following districts:—Chinglepat, N. Arcot, S. Arcot, Chittoor, Tanjore, Trichinopoly (except the taluqs of Kulitalai, Karur and Musiri which are in charge of Mr. Day at Coimbatore) and the Eastern part of Madura as far south as Dindigul, to W. G. F. Walters Esq., Upasi Office, Chinglepat.

His telegraphic address is "Upasi," Chinglepat."

SOUTH INDIAN PLANTERS' WAR FUND.

Amount previously subscribed	35,603	3	0
Mr. R. Lesher	25	0	0
„ G. E. Bewley	10	0	0
„ F. I. Morgan	50	0	0
„ Edward Hall £10	148	8	9
	35,836	11	9

OVERSEAS AIR CRAFT FUND.

Amount previously subscribed	4,483	14	0
Mr. N. J. Stanes	50	0	0
	4,533	14	0

DISTRICT PLANTERS' ASSOCIATIONS.

South Travancore Planters' Association.

Minutes of the Annual General Meeting held at Quilon Club, on January 22nd, 1916.

PRESENT.—Messrs. L. G. Knight (Chairman), J. Stewart. J. B. Cook, R. Rose, H. S. K. Morrell, A. W. Leslie, T. L. Jackson, J. A. Anderson, H. M. Moore, W. G. Thom, C. E. L. Lister, J. Gray, and T. P. M. Alexander (Honorary Secretary.)

By Proxy.—Messrs. A. F. Macdonald, R. Branson, A. W. Upcher, and A. H. L. White.

Visitors.—Mr. J. A. Gwynne.

AGENDA.—1. Read and confirm minutes of last meeting.
2. Chairman's address.
3. Honorary Secretary's Report.
4. Election of Office Bearers for 1916.
5. Subscription for 1916.
6. Pests Act.
7. Punalur-Pathanapuram Road.
8. Correspondence.
9. Mr. J. B. Cook's resolution that the Annual General Meeting of this Association be held on a fixed date.

The Proceedings of the last meeting were confirmed.

THE CHAIRMAN'S REPORT WAS AS FOLLOWS:—

Gentlemen,

During the past year nothing much of importance has occurred as far as this Association is concerned, so I have very little to say.

The crops secured during the year were approx: Rubber 1200000 lbs. at an average of F. O. B. cost of 60 cents, this being an increase of 200,000 lbs. and at a reduced cost of 9 cents compared to the previous year. The tea crop was $1\frac{3}{4}$ million against $1\frac{1}{2}$ million lbs. in the previous year.

The war has caused a big rise in the cost of all Estate requisites, freight, insurance &c, but this is offset by the very satisfactory prices realized both for tea and rubber during the year.

His Highness' Government propose a new ruling *re.* the sale of Forest land, demanding timber value in addition to land value; if this is carried through, it would practically prohibit all further planting extension. The Dewan received a deputation on the subject from the Combined Travancore Association consisting of Messrs. Vernade, J. Stewart, and J. A. Richardson, and it is to be hoped this will have some effect. A report of the interview is laid on the table.

I think there is nothing more to mention, and I now resign the Chair.

HONORARY SECRETARY'S REPORT.

Gentlemen,

The acreage subscribing to this Association last year was 12,912 acres being 356 acres increase of the previous year. I shall now pass round the audited Balance sheet, and Income and Expenditure a c which shows a

credit balance of Rs. 1,855-3-1. There were 3 General Meetings during the year and one committee meeting. The average attendance of members was very poor. Our Income yearly, providing all Estates continue to subscribe, is Rs. 2,421-1-0, and our obligations are at present :—

		Rs.
Postage, Stationery &c., say	...	... 80
Lady Ampthill Institute ,,	...	... 100
Travancore Combinded P. A.	...	... 25
Honorarium	...	... 300
Bangalore Delegates' Allowance	...	... 250
Subscription to U. P. A. S. I.	...	... 1,614
		Total Rs. 2,369

In the year 1914, from the report, I can see so many of our members have gone home, and there were only a few members, but in this report, I can say the members left has been increased by four young men who arrived from home during the latter part of the year.

We have to thank Mr. Henderson for kindly auditing our accounts, and I now place my resignation before the meeting.

ELECTION OF OFFICE BEARERS.—The following were elected office Bearers for the year 1916.

Chairman	...	Mr. J. B. Cook.
Honorary Secretary	...	A. W. Leslie.
Committee	...	Messrs. R. Ross, L. G. Knight, and H. S. K. Morrell.

PESTS ACT.—The Honorary Secretary was asked to circulate copy of correspondence received from the U.P.A.S.I.

PUNALUR-PATHANAPURAM ROAD.—The Honorary Secretary was instructed to write to the D. P. W. regarding the very bad state of this road between Punalur and Pathanapuram, and to request that Government take immediate steps to have this road put in good repair.

Mr. J. B. Cook's resolution that the Annual General Meeting of this Association be held on a fixed date :—It was proposed by Mr. J. Stewart, and seconded by Mr. R. Ross that the first Saturday of February be fixed for the Annual General meeting.—*Carried.*

SCIENTIFIC OFFICER.—It was proposed by Mr. R. Ross, and seconded by Mr. J. B. Cook that Mr. Anstead be asked to visit the district.—*Carried unanimously.*

SRI MULLAM ASSEMBLY.—There being no subjects to bring forth at this Annual Assembly, no delegate was elected.

SUBSCRIPTIONS.—It was proposed by Mr. J. Stewart, and seconded by Mr. Alexander, that Annas $1\frac{1}{2}$ per cultivated acre be the rate of subscription from the Estates to this Association for the current year.—*Carried.*

A vote of thanks to the Chair closed the proceedings.

(Signed) J. B. COOK,
Chairman.

(,,) A. W. LESLIE,
Honorary Secretary.

Bababudin Planters' Association.

Proceedings of a Quarterly General Meeting held at the Kadur Club, Chickmaglur, on Wednesday, January 26th, 1916.

PRESENT:—Messrs. A. C. W. Denne, F. Hugonin, H. W. Raikes, S. J. Wilson, and S. H. Dennis (Honorary Secretary.) Mr. Hugonin in the Chair.

The minutes of the last meeting were confirmed.

LABOUR RULES.—Prior to the meeting a copy of the revised rules had been circulated amongst members.

Rule 6 was discussed at some length, it was then proposed by Mr. Denne and seconded by Mr. Dennis,

"That the Labour Rules be adopted by this Association."—*Carried.* One member being a dissentient.

PEST ACT.—The following resolution proposed by Mr. Denne and seconded by Mr. Wilson was carried.

"Before this Association expressed an opinion on the draft Pest Act of the Madras Government it would like to know the opinion of Dr. Coleman, the Director of Agriculure for Mysore."

ROADS.— Read letter from the Executive Engineer, Kadur District dated 17th November 1915.

The Honorary Secretary was requested to write and ask the Executive Engineer, as to what the District Boards' reply was, to his suggestion, that the allotment for the up—keep for the Birur-Lingudhully road should be increased.

PROPOSED KULHUTTYPUR-HEBBE ROAD.—As regards this road, it was hoped Government would expedite matters, the road being urgently required by many Estates of a large area.

BABABUDIN HILL ROAD.—With reference to the Officiating Secretary to the Government of Mysore, General and Revenue Department's letter dated 9th March, 1915.

The Honorary Secretary was requested to write and ask Government, if, as the tentative year has now expired, there was any probability of the toll-gate being removed.

SANTAVERI DISPENSARY.—The Special Revenue Officer M. I. S. Kadur and Hassan Districts' letter dated 22nd November, 1915 was read.

The Honorary Secretary was instructed to approach the Government of Mysore and enquire, as to what orders, if any, have been passed on this subject, quoting the above mentioned letter.

SANDERSON WARD.—The following resolution proposed by Mr. Raikes and seconded by Mr. Hugonin was carried *nem. con.* "That the North and South Mysore Planters' Associations be approached with a view of raising the balance of subscriptions necessary for the proposed store room."

COFFEE STEALING.—The Secretary to the Government of Mysore, General Department's letter dated 11th December 1915, was read and recorded with satisfaction.

The meeting closed with a vote of thanks to the chairman.

(Signed.) S. H. DENNIS,
Honorary Secretary.

LUMINOUS INSECTS.

The power of emitting light at night is a property that has been developed to varying extent in many different branches of the animal kingdom. We find it, for instance, in the Protozoa, *e.g.* Noctiluca, an organism which, though microscopic in size, is sometimes present in such countless millions on the surface waters of the ocean as to make the whole sea appear to be ablaze with a pale, cold, "phosphorescent" light. Higher in the animal scale we find the property well developed in the Hydrozoa, *e. g.* Pyrosoma, a colonial oceanic form. We have it again in numerous molluscs, in the insects, and even in the vertebrates, a large number of the fish that inhabit the abysmal depths of ocean, where the sun's rays can never penetrate, carrying their own lamps disposed about their bodies in patterns that vary according to species. Here, however, I propose to consider only the insects that exhibit this power.

There is, as might be expected considering the striking nature of the phenomena in question, a very extensive literature on the subject. This is for the most part scattered throughout numerous scientific periodicals, but the earliest part of it, up to 1887, has been collected together by Gadeau de Kerville in his "Insects Phosphorescents," published in that year.

It is rather remarkable that the beetles (Coleoptera) have almost a monopoly of light emission amongst insects, and even here the property is almost confined to two families. The first, and by far the most important of these, for our consideration, is the Lampyridae, or, to give them their popular name, the glow-worms and fire-flies. With them are associated one or two small closely allied families, the Pheugodidae, Rhagophthalmidae, etc., some of which are as yet very imperfectly known and unsatisfactorily characterised. In the Lampyridae proper the luminous organs, when present, are generally found in both sexes, through frequently more strongly developed in one than in the other, and are situated in the terminal or subterminal segments of the abdomen, the light being shown from the ventral surface.

All members of this society are familiar with the glow-worm of this country, *Lampyris noctiluca*. I will remind you that in this species, in the adult stage, the light-giving property is practically confined to the female. Destitute of wings, she is rather an unlovely object, doomed to crawl about amongst the grass and low herbage, while her prospective spouse enjoys the freedom of the air above her. Yet her light is emitted from the underside of her tail, a situation that would not at first sight appear to be particularly well chosen as a source of illumination. Her *modus operandi* in exhibiting her light is usually to climb a little way up some convenient stem and to sit there with her lamp suspended, her body twisted a little to one side so as to exhibit the light without obstruction. If she can find no stem stiff enough to bear her weight she will remain with her body on the ground, the abdomen twisted to one side to expose the light as freely as possible, turning it first to one side then to the other in her attempt to attract the attention of wandering males. At Lugano Mr. H. Main and I have observed that they were particularly partial to old walls, even sitting 10 or 12 ft. above the ground. Though we found the larvae fairly plentiful in the grass the female beetles were always on the walls, and in such a situation their light was plainly visible from a long distance; the twisting motion of the abdomen was also clearly observed.

Luminous organs are present in the male glow-worm in a similar situation, but to a very minor degree. The extent to which they are functional possibily varies in different localities. It is probable that in this sex the light is emitted only for a comparatively short time after reaching maturity, and that it soon becomes exhausted.

Photogenic organs are also present in an advanced degree in both the larvae and the pupa; even the eggs are luminous, though there is here no definite light organ, but the whole surface glows faintly.

To the same family belong the "fireflies" of Southern Europe. Of these there is a considerable number of species, which possibly present slight differences in the details of their light emission. One of the best known, is *Luciola italica* of northern Italy, a species the habits of which Mr. Main and I had the pleasure of studying at Lugano.

Luciola italica was observed on the evening of our arrival at Lugano, in the grounds of the school, near the lake. Though abundant after dark, they were scarcely to be observed during the day. The first flashes were seen about 8-30, while the lingering daylight was fairly strong, and they were most numerous about 9-30 or 10, after which time their numbers noticeably decreased, though they could still be seen from our bedroom windows well after 11 p. m.

As was to be expected, all the fireflies caught on the wing were males. They have a fairly steady, not very rapid, flight, and flash their light at almost regular intervals, but they do not obviously appear to be searching for the females. When they do perceive an answering flash—and the discovery seems to be a matter of accident rather than the result of deliberate search—they pause in their course, and then fly down to it, although they may be as much as 10 ft. away.

The females were never observed to use their wings, but were always found on the grass or the herbage. In these insects, unlike the American Photuris, etc., observed two years ago, the initiative in seeking a mate appears to be with the female, as in the case of Lampyris. At times they will appear quite dark, while sometimes they will glow with an almost steady, though not very bright, light. When "calling" for a mate, however, they flash with rather long slow flashes, incompletely extinguished in the intervals. Such a period of flashing is usually of short duration, and is succeeded by a dark period. It is this succession of slow flashes that bears the appearance of definitely calling for a mate, and during which the males most readily approach her, though they are also attracted to some extent by a steady glow.

The males, both in captivity and in nature, *i. e.* when caught in a spider's web, were observed to glow with a constant though not very brilliant light, somewhat resembling the steady light of a female, but no case of flying males approaching these dead males was observed.

The mating habits of many American Species of Lampyridae, popularly known as lightning bugs, have been investigated recently by McDermott. In these insects, as in the European Luciola, both sexes are luminous, and the light is emitted as a series of coruscating flashes. Again, the male has the more brilliant light, but in these insects he seems to take the initiative in searching for a mate, hovering over the ground flashing his lamp, and apparently watching for an answering flash from the less active female concealed in the grass.—*Nature.*

(*To be Continued.*)

CORRESPONDENCE.

January 9th, 1916.

My dear Norton,

I wonder how you are all getting on. You will be surprised to hear from me I expect. I am at the moment at Home on leave, sick slightly. (Bronchitis). All right again now and return to Flanders on 15th.

We have been having a very poor time lately in the Trenches, the weather has been very bad, the mud simply awful, and the Boche rather peevish. This means trouble all round, as now our munitions are increasing so rapidly, we never take any signs of temper on the Huns part, lying down. In fact we stir the Blighter up pretty often. Personally I live in the cellars made under the ramparts of a town in Flanders of which you have probably heard, as its name seldom fails to appear in the "daily liars." It is a rum life and full of incident as a rule. Most of our work is done by day as it is pretty unhealthy to show ones self in daylight. He has a nasty way of sniping you with a "wizzbang," or 77mm field gun.

I enclose a note on the crops of Belgium that I have seen, especially this damned chicory. The country is full of it.

Give my love to any pals you may come across and do send me a line giving me any news of Coorg and Planter pals.

If you care to put this note on crops into the *Chronicle* you are welcome to it. I am still Brigade Bombing officer, and *H. Qrs. 51st Infantry Brigade, B. E. F.* will always find me.

Yours ever,

JOHN A. GRAHAM.

P. S.—I am a Capt. these days. What the H—ll are you laughing at ?

Chicory.

On our arrival in Flanders in July last the principal crops one noticed were Wheat, Sugar Beet, Potatoes, Chicory, Hops, Oats, Barley, Turnips, Cabbage. The order in which they are named is a rough indication of their frequency.

As a Coffee planter naturally, I was most interested in chicory, This pernicious weed is cultivated as a field crop. It is one of the minor horrors of this War in this unfortunate country, and my private opinion is that a nation that will cultivate chicory on the scale it appears in Flanders is almost fitted to be cast to the Boches. This may sound a bit severe but Coffee Planters will endorse every word of it.

It grows like a straggly Cos Lettuce. The leaves are sometimes bleached and eaten as a salad but are too bitter to suit the average British palate. It tastes like endive. The roots are large and forked something like a big parsnip. The chicory is one of the last crops to be harvested and the roots are left in the ground till late autumn. The tops are then cut off with a sickle and left on the ground as a green manure and the roots are ploughed out, collected, and carted to a drying shed, sometimes the same building as the Hop kilns. There they are freed from adhering earth, and chopped into squares, about 2 inches.

These bits are then put into a circular, rotary, Roaster, which revolves over a charcoal fire till the contents are so dry as to be easily ground up. While the process of roasting goes on the most revolting smell issues from the machine which is the fumes off the burning chicory. The stuff is now ready to ruin the taste and flavour of our fine products, and a decent cup of coffee seems unprocurable in this unhappy country.

Owing to the war, many thousand acres of chicory were not harvested in the autumn of 1914, especially in the Salient and further S. Round St. Eloi I have seen it running up to seed about 4 feet high. A pretty blue, Cornflower like, flower grows up the stem. In this state it makes fine cover for game and one constantly sees Pheasants, Partridges, Rabbits, and Hares in it.

I would like to see some scientist make a study of the land in the immediate neighbourhood of the trenches after the War to see if the constant shocks by High Explosive has any effect on the productiveness of the soil, beneficial or otherwise. A good deal used to be said about the benefits to be derived from the use of Dynamite in soils, and this seems a good chance of seeing what the result may be.

J. A.

9/1/16.

S. I. P. War Fund.

Dear Fletcher Norton,

I have several times meant to write before and have always failed. Thanks awfully for the papers you sent me *re* the Planters War Fund. I can't write a sort of official letter. So I hope this will do. I have left the L. N. L. and have got a commission in the 4th King's African Rifles; the relief at getting away from a tommy's life is overpoweringly great, and I would never enlist again under any circumstances, though everyone was d-d. good to me and I've no doubt the experience has done me a lot of good. Hammond is also in the 4th and Morgan and Houchen have got commissions in the service Battalion of the Uganda Police. I hope to see them later on. We only left the L. N. L. on the 1st of December. I often used to think of that excellent hamper which we took away from Bangalore on the train with us, it was good. Of course you heard of poor Stoke's death? Anyhow he was killed outright and its a comfort to think that he did not suffer at all. I saw him just before he was buried and his face had an absolutely peaceful expression. It is awful to think of all the good ones getting blotted out. I hope to goodness the d-d war will be over in 1916. I long to get back to Coorg. This is a marvellous country for Coffee. But I don't think I could ever persuade myself to leave Coorg now, as all my best pals are there. I heard from Dickenson some-time back. He is driving a motor Ambulance for the French Red X. There is nothing of interest to tell you, so I will close down. I think it is sporting of all planters left in India to raise this War Fund for us. We all know jolly well that they would be fighting somewhere too, if they could get away. I saw that poor Bailward was killed, I suppose it was the same fellow in the 26th Was'nt? I must stop now. If you see Cox, Wood or any of the Coorg Push, please give them my best love.

Best luck for this new year
Yours ever,
ARTHUR NICOLLS.

5th Brigade, R. H. A.,
Dear Fletcher Norton, 6—1—1916.

I got your Secretarial letter and enclosure re. South Indian Planters War Fund and I'm sure it is very nice of them to guarantee us a passage out. That is to say the lucky ones, who manage to dodge the bullets. I've put myself in touch with Mr. McFarlan anyway, and asked him whether there is a chance of getting a berth again in any of the planting districts.

I've met planters from all over the world but only one from the Madras Presidency. You know Buchan I think who used to be in Bangalore. He has just been appointed Captain of this Brigade Ammunition Column. I met him at a Planters Meeting at Bangalore in 1913. I've been out here since the beginning of March and have been lucky, as I'm now Adjutant of this Brigade.

With kind regards,
Yours sincerely,
W. EVERETT BOWNASS LT., R. F. A.

Peermade,
South India,
3—2—1916.

Helopeltis.

THE EDITOR,
Planters' Chronicle,
Bangalore.

Dear Sir,—Can any of your readers who have had experience of treating helopeltis (mosquito blight) give me any information as regards spraying with Imperial Soap solution as advised by C. B. Antram, Entomologist to the Indian Tea Association? The idea is to spray as soon as tea comes in from pruning, before the mosquito gets too firm a hold, it apparently being little use to start spraying *Except right from the beginning* (*i.e.*, as soon as tea comes in). Mr. Antram states that this method in conjunction with burning prunings and hand catching had been tried in 1910 with great success on Ghazipore and other Estates in Assam, and Mr. Mann also recommends it. Local information however rather tends to belittle its utility. So I should certainly very much like to know why, if successful in Assam, it should not be so in S. India.

Yours Faithfully,
"WORRIED."

Chemoni Valley Estate,
Palapilly, P. O.
5th February, 1916.

Rubber and Cultivation.

THE EDITOR,
Planters' Chronicle,
Bangalore,

Sir,—I have read with great interest Mr. Murphy's letter of the 7th ultimo in the *Planters' Chronicle*. I wish to refer to the second paragraph which contains the main point of his letter.

I must say my ideas coincide with that of Mr. Murphy's in connection with the shortage of yield.

Mr. Murphy relates to us the firm foundation of Rubber Planting on a profitable scale. He says the shortage of yield is chiefly due to the following:—

1. Check given by growth of weeds which has got out of hand,
2. Too close planting.
3. Too great excision of bark.

Of these three items No. 2 is the fault which lies with several Rubber Estates in S. India. In Ceylon the Rubber was planted 20' x 20' which I consider is a minimum distance. I have found too close planting retards the growth of this production.

I do not think climatic conditions are entirely to blame, but S. India Rubber is more or less exposed to a cold high wind in certain months in the year, and I believe in keeping wind belts where it is necessary. Before concluding I should like to add that in Ceylon I was tapping with women coolies, and as this is a delicate piece of work, I have found them better than men and at the same time it is cheaper. I should like to know if any Planters of Southern India have found this to be the case.

Yours faithfully,

J. V. SHANK.

RUBBER BY QUANTITY.

IMPORTS OF RUBBER.		1913.	1914.	1915.
From Dutch East Indies (centals of 100 lbs)		N.S.	N.S.	9,970
„ French West Africa	„ ...	871	694	549
„ Goald Cost	„ ...	316	64	477
„ Other Countries in Africa	„ ...	N.S.	N.S.	7,791
„ Peru	„ ...	666	976	1,865
„ Brazil	„ ...	23,553	10,476	24,320
„ British India	„ ...	N.S.	N.S.	3,913
„ Straits Settlements & Dependencies including Labuan	„ ...	30,943	45,658	53.139
„ Federated Malay States	„ ...	20,814	17,077	24,741
„ Ceylon & Dependencies	„ ...	13,663	22,988	19,083
„ Other Countries	„ ...	44,383	14,596	2,638
	Total Import...	135,189	112,459	148,486

RE-EXPORTS OF RUBBER.		1913.	1914.	1915.
To Russia	(Centals of 100 lbs.)	13,707	10,665	48,982
„ Germany	„	12,876	...	...
„ Belgium	„	5,430	...	...
„ France	„	14,650	4,972	8,273
„ United States of America	„	44,996	65,995	50,012
„ Other Countries	„	5,824	6,497	12,233
	Total Re-Exports ...	97,483	88,129	119,500

—*The Indian-Rubber Journal.*

The Planters' Chronicle.

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THE U. P. A. S. I.

(INCORPORATED.)

The Director of the Labour Department writes us as follows:—

"Kindly announce in the *Chronicle* the sad news of Day's death. He returned from a short business tour in the Anamallai District on Monday the 14th instant. He appears to have fallen ill on Wednesday afternoon, but continued to work on Thursday, when he became seriously ill with the recurrence of intestinal hemorrhage to which he was subjected. A nurse from the Lady Ampthill Nursing Institute arrived from Madras on Friday morning and took charge of the case. Malignant malaria supervened when the hemorrhage stopped, which affected his brain, and he became practically unconscious on Saturday evening and remained so till the end, death occurring at 8-30 P. M. on Monday 21st instant. There was also a dangerous condition of the heart which complicated matters." We would express our sincere sympathy with his family in their bereavement; and deplore the loss to the Department of a conscientious worker.

The Director asks us to inform all subscribers that he will make Coimbatore his temporary headquarters and will combine the Deputy Director's work with his own until suitable arrangements can be made. Subscribers are therefore requested to address correspondence accordingly.

We very much regret to point out that some errors were committed in the printed report of the Mundakayam Planters' Association, appearing in the issue of February 12th. The errors will be found corrected on a separate slip.

Below will be found the subscriptions to the Overseas Air Craft Fund amounting to date to Rs. 4,593-14-0. Of this total, Rs. 4,417-2-9, were remitted on February 17th to the Secretary of the Overseas Club, in England as a contribution from the U.P.A.S.I.

OVERSEAS AIRCRAFT FUND.

	Rs.	A.	P.
Amount previously subscribed	4,533	14	0
Mr. J. H. Robinson	30	0	0
,, J. Sampson	10	0	0
,, J. Lloyd	10	0	0
,, J. Jones	10	0	0
Total Rs...	4,593	14	0

SCIENTIFIC DEPARTMENT, U. P. A. S. I.

Tea Production in Ceylon.

In the *Sixty-second Annual Report of the Planters' Association of Ceylon* for the year 1915 it is stated that the estimate of the Tea Crop for 1916 is 205 million lbs. distributed as follows:—

	lbs.
United Kingdom	116,500,000
Russia	22,500,000
Continent	2,000,000
America and Canada... ...	19,000,000
Australia	29,000,000
China	7,000,000
Other Countries	2,000,000

"The Report states that "although prices throughout the year were" "on a high level, the average quality was lower than usual, no really" "stand-out teas were made in any districts: such as there were came from" "the higher elevations on the Kandy side. Uva particularly was unable to" "make any, owing no doubt to the rains falling out of season. Red stalk" "was very prevalent from everywhere. Perhaps an excessive use of one" "chemical in the manure may be the cause of this."

"Shipments of Green Tea are slightly larger than last year's exports," "the figures to date being 4¾ millions against 4½ in 1914 and it is estimated" "that by the end of the year the exports will total about 5¼ million pounds." "London shipments have increased some 100,000 pounds, whilst American" "shipments have increased some 400,000 lbs. The Russian shipments it is" "estimated will also show an increase of about 300,000 lbs. over last year." "Quality, with the exception of a few estates which have maintained a" "good standard throughout the year, has been rather disappointing, and" "complaints have been received from the consuming markets that the dry" "leaf contained too large a percentage of twankey and stalks. There is" "undoubtedly a general feeling in all markets that Ceylon Green Tea is" "not so carefully manufactured as it used to be. Turning to 1916, on" "account of the high prices for Blacks which have prevailed this year, the" "present indication is that the output of Green Tea will be considerably" "reduced next year."

The following figures of out-turn and yield have been extracted from the Annual Reports of the different Ceylon Planters Associations as published in the *Ceylon Observer* (*Weekly Edition.*)

District.	Total acreage.	Acreage in bearing.	Crop in lbs.	Yield per acre.
			Estimated for 1916.	
Dimbala ...	47,594	46,736	28,525,500	610
Kamboda ...	4,880½	3,799	2,018.200	521
Ambegamuwa ...	19,483	15,348	6,525.000	463
Haputale ...	23,139	20,448	11,357,950	555
Dikoya ...	30,801½	27,675½	16,347,500	592
Maturata ...	6,430	6,122	3,420.000	558
Maskeliya ...	—	18,255	9,460,500	518
Dolosbage Yakdessa	15,772	11,066	4,113,500	372
Morawakorale ..	—	3,634	1,939.550	533
Passara ...	13,936	12,698	7,433.500	585
Pussellawa ..	21,974	20,476	9,649.000	471
Kegalle ...	6,790	3,297	1,505.000	450

Rubber Production in Ceylon.

The Report quoted above contains the following on the subject of Hevea Rubber:—

"Climatic conditions for the first six months of the past year were" "exceedingly favourable for harvesting of crops. The second half of the" "year was decidedly the reverse, especially so in July and November," "most estates being considerably behind the same two months in 1914." "From figures to hand it would appear that the majority of estates are" "rather behind their estimate. There have not been many changes either" "in methods of collecting or curing the latex in the past year. A number" "of estates with a large crop make a certain percentage into smoked" "sheets; but where machinery is available for crepe, it is only found" "advisable to make smoked sheet when the prices of rubber in" "this form are considerably above that for crepe, as, except in" "very favourably situated estates, smoked sheet costs 2 to 3 cents more" "to manufacture. Tapping in the way of removal of bark continues to" "improve, 10 inches a year being now a fair average, the best we have" "heard of authenticated being 7 inches per annum. Cost of tapping" "decreases as yield increases and the following table probably gives the" "average costs for various yields:—"

200 lbs.	per acre	—	20 cents. per lbs.
300 „	„ „	—	17 „ „ „
400 „	„ „	—	13 — 14 cents per lb.
over 400 „	„ „	—	10 — 13 „ „ „

"It is hardly probable that it will come down below the latter figure" "except in very exceptional cases. A large number of Planters are" "strongly in favour of changing over every six months, one great argument" "in favour of this being the ease with which bark removal can be checked." "Diseases have been rather worse than in previous years, the chief ones" "being ordinary Bark Canker, Leaf-fall, and Die-back of renewed, bark." "The worst of these is undoubtedly the last named, which is very serious" "in continued wet weather. Various forms of cures are now being tried," "with what success it is too early to say. Very little extension of the" "acreage under rubber has been made during the past year, but it is" "possible that recent rise in prices may stimulate efforts in this direction." "Thinning out has been proceeded with on most estates, the idea being to" "get the number of trees per acre down to 80 or 100, and probably even" "less in the future. Where estates are judiciously thinned out and culti-" "vated diseases are less noticeable and bark renewal is much more rapid." "A six years renewal is still considered the ideal to work for. Owing" "to the shortage of Potash manures for the past year mixtures have" "had to be considerably changed, but there has been no need to" "curtail manuring programmes; where this has been done the foliage" "suffers most noticeably and with it the general health of the tree" "and flow of latex. Liming is now done on many estates, the object" "being to free Potash in the soil and otherwise available, and thus supply" "the shortage in manure mixtures now applied. One is now better able" "to estimate the eventual yield per acre of rubber in full bearing properly" "thinned out. 350 lbs per acre might be put as a fair average, varying from" "250 to 450 according to the climate and position of the estate. There" "are now a ew cases of estates giving 500 lbs per acre."

The following figures of out-turn and yield have been extracted from the Annual Reports of the different Ceylon Planters Associations as reported in the *Ceylon Observer (Weekly Edition).*

District.	Total acreage.	Acreage in bearing.	Crop in lbs.	Yield per acre.
			Estimated for 1916.	
Dimbala ...	—	—	2,000	—
Ambegamuwa ...	1,891	1,773	361,200	204
Haputale ...	—	2,982	669,500	234
Dolosbage Yakdessa	—	1,467	257,800	176
Passara ...	6,321	5,551	1,320,500	237
Pussellawa ...	3,417	3,310	849,950	256
Kegalle ...	12,838	10,426	3,011,000	290

Cardamoms In Ceylon.

The Report quoted above says on the subject of Cardamoms:—

"The exports for 1915 reached 519,039 lbs. against 404,070 lbs. in" "1914. This increased output for 1915 is principally due to the fact that" "in 1914 a large quantity was held back owing to the low prices ruling at" "the end of that year. The falling off in the shipments to Germany," "Sweden, and Turkey has had the effect of depressing the market for" "Cardamoms, and prices have been very irregular during 1915. The" "weather during the first half of the year was suitable for this product," "but owing to the partial failure of the North-East monsoon, the crop for" "1916 will be short and shipments will not exceed 450,000 lbs."

The following figures of yield have been extracted from the Annual Reports of Ceylon Planters' Associations:—

District.	Acreage.	Crop in lbs.	Yield per acre.
		Estimated for 1916.	
Dolosbage Yakdessa	519	49,500	95
Morawakorale ...	...	2,500	...
Pussellaws ...	13	1,500	115
Maturata ...	152	10,000	65

The Cochin Rubber Co.

It is of interest to compare with the above figures those which appear in the Directors Report on the Cochin Rubber Co., which has recently been published. The acreage is as follows:—

Planted in 1906	413·68	acres
„ „ 1907	207·82	„
„ „ 1908	174·14	„
„ „ 1909	7·48	„
„ „ 1910	191·09	„
Total acreage planted	994·21	
Acreage in bearing	803	

Crop, 200,028 lbs of dry rubber in eight months tapping only, due to the new factory not being ready till May.

Yield per acre 249·06 lbs. Yield per tree 2·14 lbs.

Estimated crop for 1916, is 250,000 lbs to cost 49·97 cents per lb. c. i. f. Colombo. This allows for manuring 500 acres and liming and forking the balance at a total cost equivalent to 8·95 cents per lb.

Rainfall, 128·63 inches.

RUDOLPH. D. ANSTEAD, *Planting Expert.*

MINERAL PRODUCTS OF INDIA.

Whilst he was director of the Geological Survey of India Sir Thomas H. Holland instituted a system of quinquennial reviews of the mineral production of India, beginning in 1898, and these reviews have appeared regularly every five years since 1903, practically upon the same lines as originally laid down. Their appearance is always a matter of interest to all students of mineral statistics, whether their interest be mainly scientific or mainly commercial, and the present volume, covering the period 1909 to 1913, contains much matter of importance from both points of view.

The two most important, economically, of the mineral products of India are coal and gold; in the five years ending 1908 the average annual output of gold was valued at 2,266,307*l*., and that of coal at 2,139,249*l*., so that the former was the more important, in spite of the fact that the period included the boom years 1908, when the value of the coal output jumped up to more than 3,350,000*l*. In the period now under review the positions of these two items have been reversed, the average value of coal being 2,969,305*l*. per annum, and that of the gold 2,241,844*l*. It will be noted that the gold output has been practically stationary throughout the whole decade; that of coal showed a drop in 1909 from the boom year 1908, and then a steady increase up to nearly 3,800,000*l* in 1913, which may be taken as a most satisfactory symptom, and as indicating that the Indian coal trade is now on a firm and stable basis. The output in 1913 had reached a total of 16,208,000 tons, nearly double what it was ten years previously, and of this large total nearly one-third was consumed on the Indian railways, which again is an indication of the prosperous condition of the country as a whole. It is important to note, furthermore, that India has the benefit of cheap fuel, the price at the pit's mouth being only 4*s*. 8*d*., or but little more than half of what it is in this country.

The accident death-rate for the five years under review shows unfortunately a considerable increase over the previous quinquennial period, namely, 1·38 lives lost per 1000 persons employed as against 0·98 per 1000; even the former figure is, however, lower than the average in Great Britain. On the other hand, the output of coal per person employed (below and above ground) shows a slight improvement, namely, 109·4 tons as against 98·6, this figure being two-fifths of what it is in the United Kingdom. It must not be forgotten that a considerable amount of British coal is machine-cut, whereas coal-cutting machines make practically no headway in India on account of the relatively cheap native labour. It is interesting to note that two batteries of bye-product coke-ovens have at last been installed on the Giridih coal-field, capable of producing 40,000 tons of coke and 400 tons of sulphate of ammonia annually. It can only be hoped that further installations of such coke-ovens will be made, and that Indian agriculturists will learn to appreciate the value of sulphate of ammonia as a manure.

Amongst other items of interest may be noted the commencement of the operations of the Tata Iron and Steel Co. at their Sakchi works, in consequence of which the production of iron ore in India jumped up by about 300,000 tons in 1911. The Barakar Iron Works also have replaced their former somewhat uncertain sources of iron ore supply by mines in the Manbhum and Singhbhum districts, and are now smelting about 96,000 tons of ore per annum.

Lead and silver appear for the first time in the table of mineral production, owing to the successful operations of the Burma Mines, Limited, at the ancient Bawdwin mines; the average annual production has been just about 9,000 tons of lead, carrying 80,000 ounces of silver, for the past five years.

Finally attention may be directed to the fact that various mines of the Salt Range have been found to contain in places a not inconsiderable proportion of potassium; some of the raw materials contain more than 11 per cent. of this element, and although its extraction presents some difficulties, the problem appears to be quite capable of solution. In view of the great demand that there is for potassium salts, and the urgency of finding fresh sources of supply, it cannot be doubted that this subject will receive all the attention that its importance deserves. It would indeed be fortunate if the needs of the British Empire in this respect could be supplied from our great Indian dependency.—*Nature.*

Empire Resources in food Production.

A blue book published last week contains valuable information regarding the resources of the Empire in food production. With regard to wheat, it is shown that the percentage of total imports received from the Empire rose from 29·4 per cent. in the period 1905 to 69·4 per cent. in the three years ended 1913. This large increase was mainly due to Canada. As to future supplies, figures are given which show that while in European and extra-European countries the increase in the wheat-growing area is proceeding practically at the same rate as the increase in population, in the British Empire the wheat area is developing far more rapidly, so that the Empire, as a whole, is becoming more self-supporting. The total production of wheat within the Empire, which was 227,500,000 cwt. in 1901, had risen to 399,700,000 cwt. in 1911, an increase of 75 percent; in the same period the wheat area increased by 45·5 per cent. whereas the percentage of population rose by only 6·6 per cent. As regards meat, only in the case of pork, bacon, and hams have the supplies from the dominions shown a tendency to decline. But the Canadian export trade has materially decreased of late years; in fact, Canada now imports mutton from New Zealand for her own consumption. Statistics are given which indicate that, in general, the producers of the United Kingdom have in recent years held their own in the production of food supplies.—*The Field, The Country Gentleman's Newspaper.*

According to the report of the Nyasaland Customs Department on the external trade of the Protectorate during the year ended 31st March 1915, the tea industry in that country continues to make steady progress. The amount of tea shipped during the last five years has steadily increased; in 1910-11 the export amounted to 42, 042 lbs., but in 1914-15 it amounted to 166,248 lbs. The effect of the war on the trade of the Protectorate has naturally been a depressing one, but the net result has been a loss of only £692 of revenue as compared with 1913-14. That under normal conditions the trade would have most probably shown a substantial increase is pointed to by the fact that 66 per cent. of the total revenue was collected in the first six months of the fiscal year (April to September).—*Indian Planters' Gazette.*

RUBBER.

Import and Export Trade in 1915.

The official figures show that our imports of raw rubber during the year reached the record figure of 182,565,900 lb. The value was £20,225,060, which works out at slightly over 2s. 2d. per lb. A gratifying fact is that the great bulk of our importations is now of British growth; forest production has fairly been beaten by plantation production, and our imports of forest-grown rubber now rank at but little over one quarter of the total. Thus in very few years, as one reckons the growth of an industry, has been established a trade which for value of annual output puts the much vaunted aniline dye industry of Germany completely in the shade, and renders every manufacturing country in the world tributary to us for its raw material.

The detailed figures showing countries of origin for imports and countries of destination for re-exports are given below, and require no comment, except that it may perhaps be said that re-exports appear to have been permitted to a slightly greater extent than was advisable, given the necessity for maintaining our own supplies. As, however, undischarged cargoes waiting in the Thames are probably not taken into account, the basis for this criticism may be more apparent than real; it relieves us, moreover, of the charge that might have been brought against us of hoarding up supplies and putting neutrals to unnecessary inconvenience.

RUBBER BY QUANTITY.

Imports of Rubber.	1913.	1914.	1915.
From Dutch East Indies (Centals of 100 lbs) ...	N. S.	N. S.	64,119
„ French West Afria „ ...	22,610	6,290	42,552
„ Gold Coast „ ...	14,935	5,644	6,318
„ Other countries in Africa „ ...	N. S.	N. S.	101,340
„ Peru „ ...	29,133	15,523	15,582
„ Brazil „ ...	363,595	277,433	286,391
„ British India „ ...	N. S.	N. S.	32,888
„ Straits Settlements and Dependencies, including Labuan „ ...	338,313	473,599	660,532
„ Federated Malay States „ ...	221,304	219,991	288,803
„ Ceylon and Dependencies „ ...	150,182	209,693	286,097
„ Other Countries „ ...	434,367	307,023	40,037
Total Imports ...	1574,439	1515,196	1825,659

Re-Exports of Rubber.	1913.	1914.	1915.
To Russia (Centals of 100 lbs.)...	142,326	168,156	259,061
„ Germany „ ...	217,944	158,360	—
„ Belgium „ ...	50,820	33,154	—
„ France „ ...	118,908	110,573	152,097
„ United States of America „ ...	398,510	541,615	831,801
„ Other Countries „ ...	79,761	87,373	179,895
Total Re-exports ...	1008,269	1099,231	1422,854

RUBBER BY VALUE.

Imports of Rubber.		£	£	£
From Dutch East Indies	...	N. S.	N. S.	716,151
,, French West Africa	...	284,808	59,731	400,853
,, Gold Coast	...	147,098	45,988	39,749
,, Other countries in Africa	...	N. S.	N. S.	915,608
,, Peru	...	445,681	186,078	178,271
,, Brazil	...	5640,700	3433,581	3240,729
,, British India	...	N. S.	N. S.	372,313
,, Straits Settlements and Dependencies including Labuan	...	5299,206	5248,734	7384,830
,, Federated Malay States	...	3532,173	2512,500	3340,071
,, Ceylon and Dependencies	...	2309,324	2328,024	3230,218
,, Other Countries	...	2568,029	2029,792	406,217
Total Imports	...	20524,019	15844,428	20225,060

RE-EXPORTS OF RUBBER.

Re-Exports of Rubber.		£.	£.	£.
To Russia	...	2205,205	1860,362	2858,843
,, Germany	...	3342,715	1690,972	—
,, Belgium	...	789,151	364,856	—
,, France	...	1876,506	1294,656	1772,100
,, United States of America	...	5417,127	5912,899	9273,915
,, Other Countries	...	1205,900	996,528	2060,638
Total Re-exports	...	14836,604	12120,273	15965,496

—*The India-Rubber Journal.*

FEDERATED MALAY STATES.

Rubber Exports during December, and year, 1915.—The following figures of the exports of cultivated rubber from the Federated Malay States during the month and year ended December, 1915, are taken from telegraphic information received by the Malay States Information Agency in London, the corresponding figures for 1914 being added for purposes of comparision :—

	1914. Tons.	1915. Tons.
December	3,361	5,111
January-December	30,697	44,524

The figures for December establish a new record for one month's export, while the total for the year, which shows an increase of 13,827 tons over the figures for 1914, establishes a record for the exports during the year.—*The Board of Trade Journal.*

LUMINOUS INSECTS.

(*Continued.*)

The lightning-bugs investigated by McDermott belong mainly to the genus Photinus, of which the species are numerous, two or more of them often being found on the same ground. The results of this investigator's observations, assisted by a series of ingenious experiments with small electric bulbs which could be operated to stimulate the flash of the insect, conclusively show that each species has its characteristic method of exhibiting its light, and that an individual of any one species will in general only reply to, or evoke a reply from a member of the opposite sex of that species. He found, however, that some species would respond much more readily to his artificial flashes than others, and that some would even answer the flash of a match.

A few details of his observations on certain species may perhaps be quoted:—

Photinus pyralis.—The flash of the female is given three or four seconds after that of the male, and is of the same colour, but of longer duration and less intense.

Females would answer in numbers to the flash of a match swung in an arc to simulate the flash of a male, though as rule not more than one female would reply to a flashing male.

A particular female would not reply to the flash of a male of another species (*P. consanguineus*) though she would to that of a match.

The male could also be deceived by a bulb placed in the grass and flashed three to five seconds after his own flash; when the bulb was flashed without the pause it was not so effective.

No male was ever observed to reply to the flash of a creeping male.

P. Consanguineus.—The male gives a double flash, two flashes in quick succession followed by a pause, then two more, and so on; the female replies within a second to the second flash of the male.

A particular female would not reply to the flash of a match, but would answer the double flash of a bulb when 20 or 30 ft. away; on a nearer approach she seemed to recognise something unusual and would no longer reply.

P. scintillans.—The male gives a short single flash and the female a longer single flash; the female in this species is apterous.

A female would reply to the first flash of a male of *P. consanguineus* but the latter takes no notice.

P. marginellus.—The male gives a single short sharp flash, yellower than that of *P. scintillans*; the female replies with a double flash, the first sharper and brighter than the second, followed at once by the second. The reply is given very quickly after the flash of the male.

P. castus.—The male gives a single flash, not so short and sudden as that of *P. marginellus*; the female gives a single flash very much like that of *P. scintillans*; but delivered immediately after the flash of the male; there is no distinct pause as in *P. pyralis*, and no indication of doubling as in *P. marginellus*.

CORRESPONDENCE.

No. 179/1916. Office of the Planting Expert,
Bangalore,
21st February 1916.

Helopeltis.

Dear Sir,—Your 'Worried' correspondent will find at least one case that he wants if he will refer to the pages of the *Chronicle*, Vol. VIII. p. 206.

A good deal of spraying has been done on different estates in South India with varying success. In 'Notes on the Spraying of Tea' by Andrews and Tunstall (a Pamphlet which ought to be in the library of every Tea planter by the way, published by the Indian Tea Association and to be had from the Secretary, 20 Strand Road Calcutta price Rs. 2), it is stated that, "Spray fluids are useless in the case of a bad attack, although Antram's soap solution has been known to aid in checking a mild one. In cases where this pest has been held in check it has been the results of a combination of spraying, hand-catching, and cultural methods, and it is difficult at present to assign a proper value to each."

This is my experience. It is only by a combination of methods that the pest can be controlled. I lay great stress on the importance of pruning large areas at such a time that the young flush will get away before the attack of Helopeltis begins to be bad, and on spraying such areas at the very beginning of an attack.

The following references to the subject in the pages of the *Chronicle* may be of use to readers interested in this matter :—

Vol. V. p p. 170, 181, 187. Vol. VIII. p. 206. Vol. IX. p. 58.

Yours faithfully,
RUDOLPH D. ANSTEAD.
Planting Expert.

THE EDITOR,
Planters' Chronicle.

SOUTH INDIA PLANTERS' WAR FUND.

	Rs.	A.	P.
Amount previously subscribed	35,836	11	9
Mr. D. Elkington	150	0	0
„ E. H. Halliley	70	0	0
„ W. H. G. Leahy	20	0	0
„ J. S. Wilkie	30	0	0
„ W. A. J. Milner	20	0	0
„ W. Hendry	80	0	0
„ P. Napier	20	0	0
„ R. H. Crowther	10	0	0
„ J. H. Robinson	200	0	0
„ J. Lloyd	55	0	0
Total Rs...	36,491	11	9

The Planters' Chronicle.

RECOGNISED AS THE OFFICIAL ORGAN OF THE U. P. A. S. I., INCORPORATED.

(Secretary's Registered Telegraphic Address "Planting," Bangalore.)

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THE U. P. A. S. I.

(INCORPORATED.)

Contents.

The Finance Committee, the Scientific Department Committee and the Labour Control Committee, held meetings at Ootacamund on the 28th and 29th ultimo which were attended by Messrs. C. H. Browne (Chairman), Hon'ble Mr. E. F. Barber, Mr. J. A. Richardson, Mr. H. Waddington, Mr. C. E. Abbott, Mr. H. L. Pinches, Mr. W. A. Lee, Mr. Aylmer, Ff. Martin, Mr. R. D. Anstead and Mr. Fletcher Norton, (Secretary). Mr. J. S. Nicolls was unavoidably absent on account of ill-health.

We congratulate Mr. Anstead on his new designation.

We publish an article from the Scientific Department on Rubusta Coffee, Coffee in Colombia, Manuring Hevea Rubber and Acetylene Gas Refuse.

Published also are the Proceedings of the West Coast Planters' Meeting, the Combined Travancore Planters' Association, and the Shevaroy Planters' Association.

Concluded is the interesting article on "Luminous Insects" for which we are indebted to *Nature*.

The Honorary Secretary of the Shevaroy Planters' Association writes, "This Association has lost another of its promising and sporting young members in Mr. Kenneth Ivan Foot Leeming the son of the late Mr. Herbert Leeming. He recently left India in the P. & O. Mandala to try for a commission in the Royal Artillery, but during the war will join any branch of the service where he can be useful."

Another correspondent writes us that Mr. H. J. Bryne of Yendayar Estate has now returned owing to his hand having been smashed up in Mesopotamia and rendered unfit for military service. Also that Mr. H. G. O'Reilly who left Yendayar in February 1915 and joined the Royal Irish Regiment is now a Captain. He has been in Flanders since September last.

We have heard by this mail from Mr. J. Milne Henderson, that his son Mr. James Y. Milne Henderson, formerly of the 9th Royal Scots, is now a Lieutenant in the 11th H. L. I. He was wounded by a Sniper on Monday 31st January, but we are glad to say but slightly, and he will be back at the Front almost at once. He wishes to be remembered kindly to all his old friends out here.

SCIENTIFIC DEPARTMENT, U. P. A. S. I.

Planting Expert—Change of Title.

The Government of Madras in their Order No. 276-Mis. Rev., dated 8th February, 1916, altered the designation of the Planting Expert into that of Deputy Director of Agriculture, Planting Districts.

In future when addressing Mr. Anstead officially this new title should be used.

Robusta Coffee.

A correspondent referring to what was said about *Robusta* Coffee in my recent Report on a Tour in North Mysore informs me that he has in the Nilgiris a sixty acre clearing of this variety varying in age between four, three, and two years. The four and three year old Coffee is now bearing a fine crop for the second time this year, and it seems that during next year and onwards, two crops a year may be expected. Some of the trees are now in blossom while others have spike set and small berries appearing for a second crop. My correspondent says that the Coffee has so far not been attacked by Leaf Disease and he finds that it requires less shade than ordinary *arabica*.

With regard to this question of shade it is of interest to note that in the *Annual Report of the Ceylon Planters' Association for 1915* it is stated that renewed attention is being given to Coffee in the Colony and that at Peradeniya seven different varieties are under cultivation. The experimental plantations have illustrated in a striking way the value of light shade for Coffee in protecting it from Leaf Disease and it is considered that this crop can be profitably grown over large areas of Ceylon again if sufficient attention is paid to the question of shade.

The Manager of the Peradeniya Experiment Station states in his Annual Report that the *robusta* plot has been severely attacked by Green Bug but the pest has been kept in hand by means of its parasitic fungus. Die back of the branches due to the attack of the fungus *Colletotrichum incarnatum* has also made its appearance, from all of which it will be seen that even if more resistant to diseases than *arabica*, *robusta* is by no means immune to them.

In New Caledonia (French) *arabica* coffee has hitherto been the chief variety grown, but recently *robusta* and *canephora* have been introduced, these varieties being said to be at present more immune to the attacks of Leaf Disease which has done a considerable amount of damage in the past. The Coffee in this Colony is grown under the shade of a species of *Acacia*. New Caledonian coffee is of excellent quality and fetches a high price at Havre. The largest exports were in the years 1903 and 1911 being 626 metric tons and 649 metric tons respectively.

Coffee in Colombia.

Mr. M. T. Dawe, the Agricultural Adviser to the Colombian Government has recently described some of the planting conditions in the country in *La Patria*. In the upper agricultural zone of Santa Marta Coffee is the only plant cultivated on a large scale, the largest plantation having about 350,000 trees. The altitude is 4500 feet. The trees are planted about 8 x 8 and are neither topped nor pruned. The shade tree employed is *Inga dulcis*. The average annual yield of dry coffee per tree is said to be one pound and in exceptionally favourable years as much as 1½ lbs. The

trees seem to suffer from over shading and better results might be obtained in Mr. Dawe's opinion by the use of species of *Albizzia* and *Erythrina* as shade trees, coupled with judicious topping and pruning. A disease affecting both the leaves and berries appearing as round blotches is present. This is probably due to the fungus *Omphalia flavida*. It is most abundant in deep ravines and shady places.

Manuring Hevea Rubber.

In the course of a Report on a tour in Malabar (*P. C. X. p. 634*). I expressed my views on the benefits to be obtained by manuring Rubber trees even though an increase in the crude product was not immediately obtained. In a recent issue of the *India-Rubber Journal* the following statement is made on this subject:—

"We are aware that many people argue that they have seen no" "measurable benefits from manuring rubber estates. Such critics do not" "realise the biological position. Because the benefits from manurial" "operations cannot be measured in an immediate increase in rubber crop" "many people imagine that manuring is largely waste expenditure. We" "think, however, that even the pessimistic or ignorant planters—if such" "be still in existence—will each admit that an improved soil should mean" "a more rapid rate of growth. Now it so happens that the cambium" "which is responsible for the increased rate of growth, behaves in a most" "constant manner, adding wood cells on the inside and cortical cells" "on the outside. It does not produce widely varying proportions of wood" "and bark. The cambium for every wood cell it makes produces a" "definite number of cortical or bark cells. An increased rate of growth," "therefore, means an increased number of bark cells. An increased" "number of cells in the bark means an increase in the material wherein latex" "tubes originate and subsequently become filled with latex. Therefore the" "effects of manuring can only be felt after the trees have had time to show" "an increased rate of growth, and after the newly formed cortical cells" "have had time to develop latex tubes and to become filled with latex."

"Apart from this there is the undoubted effect on the rate of bark" "renewal which manuring has on Hevea; a point to the borne in mind," "seeing that the latex to be drawn from renewed bark may not be" "measurable until a few years have passed. There is nothing wrong" "with the principle of manuring; what is lacking is patience and foresight" "on the part of directors, managers, and visiting agents."

Acetylene Gas Refuse.

It is often asked whether the refuse from an acetylene gas generator can be used as a fertiliser. The residue chiefly consists of Lime though no doubt there are impurities, so that it should be of value as a fertiliser. The *Gardeners' Chronicle* in answering a correspondent deals thus with the matter:—"Spent carbide of calcium from the generator of an acetylene" "lamp or gas plant has a manurial value. It is, however, too powerful to" "apply immediately it is taken from the generator. It should be placed" "first in some vacant corner of the garden and allowed to nearly dry; it" "can then be applied with advantage to vacant land in the autumn or" "spring and dug into the ground. No planting should be done until at" "least two months after the application of the refuse."

RUDOLPH D. ANSTEAD,
Deputy Director of Agriculture, Planting Districts.

DISTRICT PLANTERS' ASSOCIATIONS.

West Coast Planters' Association.

Proceedings of an Extraordinary General Meeting held at Malabar Club, Calicut, on 19th February, 1916 to consider the Draft of Proposed Pest Act.

PRESENT.—Messrs. R. H. Crowther, Campbell Hunt, R. Lescher, A. C. Morrell (Chairman), H. R. Carson Parker, A. H. Robb and H. Waddington (Hon. Secretary).

255. *Proposed Pest Act.*—U. P. A. circ. No. 15/15 and telegram from the Secretary of the U. P. A. of 15th February were read by the Honorary Secretary. Draft of Proposed Act was laid on the Table and considered section by section.

It was resolved that the Act as drafted be accepted with the exception that the U. P. A. be asked to press for the amendment of Sec. 6 as regards "Right of Entry" which members considered should be confined to trained Officers of the Agricultural Department and that this power should not be delegated to Officers of the Revenue Department with no special knowledge of Agriculture.

With a vote of thanks to the Chairman the meeting closed.

(Signed) A. C. MORRELL,
Chairman.

(„) H. WADDINGTON,
Honorary Secretary.

West Coast Planters' Association

Proceedings of the Annual General Meeting held at Malabar Club, Calicut on 19th February, 1916.

PRESENT.—Malayalam R. and T. Co., per Messrs. A. C. Morrell (Chairman) and H. R. C. Parker; Kerala Rubber Co., Campbell Hunt and A. H. Robb; Wandur Estate, Mr. Campbell Hunt; Eddavanna R. and T. Co. Mr. R. Lescher; Pullangode Rubber Estate, H. Waddington (Honorary Secretary) and Mr. R. H. Crowther; and Messrs. J. Christie and H. Hadow.

The Proceedings of the Last Meeting were confirmed.

The Chairman's Address.—Mr. A. C. Morrell then addressed the meeting as follows:—Before vacating the chair I propose shortly to review the events of the last year.

256. *The Rubber Theft Act.*—We have agitated for this for some years but the Government of Madras do not consider we have made out a sufficient case to justify legislation and the matter is therefore closed for the present.

257. *Pest Act.*—Has been taken up by the Association for the past six years. The draft Act is on the table and has been circulated to all members since last meeting.

258. *Scientific Officer's Scheme.*—Arrangements are being made for Government to take over this and promises, owing to the sympathy of Mr. Chadwick, to be carried out in the near future. A guarantee fund to enable us to enter into an engagement with Government for five years, has been circulated and well supported in other Districts. We hope after reference to their Agents, estates belonging to the Association, which are not already supporting it, will now be able to do so.

259. *Combined Travancore Planters' Association.*—We joined this and with its assistance a branch of the *Rubber Growers' Association* in South India is being started which we trust will be of considerable use to us.

260. *Cochin Harbour and Shoranur-Wynaad Railway.*—We are all much interested in these and hope that the scheme can be carried out and thus induce general all round competition in shipping, etc., and it may even lead to a market for our produce being established at Cochin.

261. *Shipping Freights* :—have increased to an alarming extent and show signs of still further increase owing to shortage of tonnage.

262. *Registration of Carts.*—Proposal made by the Mundakayam P. A. met with hearty support from all Rubber Planters' Associations but new legislation being necessary to carry this out, except in Municipal limits, makes it improbable that we shall see this carried out for some time.

263. *Scientific Officer.*—Mr. Anstead has made a visit recently to the Rubber Planting Districts and the Government Mycologist has visited Palapilly, and quite recently the Ernad District to investigate second Leaf Fall. Our thanks are due to the Government of Madras for kindly allowing their Mycologist to make these investigations.

264. *Timber Valuation in Travancore on lands granted for Planting.*—The new rules as regards this made the cost of obtaining land prohibitive, but I believe the Honorary Secretary will inform you that a deputation of Travancore Planters, who waited on the Diwan of Travancore, has been able to come to a working basis as regards this.

265. *Prices.*—In spite of War and the increased freight, prices have kept up wonderfully.

Before closing I should like to express my thanks to Mr. Waddington for the immense amount of work he has put in for the Association, in fact he has borne the whole of the work.

THE HONORARY SECRETARY'S REPORT.

During the year four meetings have been held, all at Calicut and all of which have been well attended. The number of Rubber Companies and concerns belonging to the Association remains as in the year previous, namely eleven, and we also have eleven private members. The acreage represented is 14,245 compared with 14,055 in 1914, managed by European Staff of 40, whose interests we look after.

266. From the accounts on the table you will see our Expenditure on running the Association was Rs. 62-8-6, an increase of Rs. 22-0-4 over that of the year previous, this is accounted for by Stationery charged (Rs. 21 0-4) nothing having been debited on that account in 1914. We sent last year two delegates to Bangalore and granted them Rs. 300 or Rs. 100 more than we paid our single delegate in 1914. We close with a balance of Rs. 799-12-2 or Rs. 76 more than at 31st December 1914. Our finances seem to be satisfactory, the outstandings being negligible.

267. We have received for and remitted to the S.I.P. Benevolent Fund Rs. 570 as compared with Rs. 260 in the previous year, but I would remind Members that subscriptions at present coming in to this fund only just cover our present grants of benevolencies and there are now many members of this Association who do not support it.

Proposed by Mr. Hunt and seconded by Mr. Lescher that the Accounts be accepted, and that they together with the Chairman's address and Honorary Secretary's Report be printed and circulated with proceedings of this Meeting.—Carried unanimously.

268. *Subscription 1916.*—The Honorary Secretary presented the following Budget for 1916 :—

		Rs.	A.	P.
Subscriptions to U. P. A. @ 2 annas an acre	...	1,818	1	0
Do L. A. N. Institute	...	100	0	0
Do Combined Travancore Planters' Association ...	...	25	0	0
		1,943	1	0
Expenses of Delegates to Bangalore ...	....	300	0	0
Local Expenses say	...	56	15	0
		2,300	0	0

He explained that although it has been our usual custom to fix the rate of subscription at such a sum, that Estate subscriptions would cover the foreseen expenditure, the same rate as last year 2½ annas an acre will give us only Rs. 2,272-10-0, but with the subscriptions from our private members our total income will be Rs. 2,382-10-0 and as we have a satisfactory balance in hand advised that the subscription for this year be at same rate as in 1915. Resolved that the subscription for 1916 be at the rate of 2½ annas per acre on Cultivated area and Rs. 10 per Private Member.

269. *S. I. Branch of the Rubber Growers' Association.*—The Honorary Secretary addressed the meeting as follows :—

I regret that I have to report that an unfortunate combination of circumstances prevented our being represented at the first meeting of this, held at Quilon on the 11th of December last. I had tried to arrange that Mr. Morrell would attend the meeting of the Combined Travancore Planters' Association held on the same day, and that Mr. Mead who was elected our representative would attend the meeting of the R. G. A. Hearing from Mr. Morrell shortly before the meeting that he would not be able to be present I wrote asking Mr. Mead to represent us at both Combined Travancore P. A. as well as the R. G. A. and heard from him on the evening of the 10th that he had left the country for Tasmania. It was then too late for me to reach Quilon by 11th or I would have gone, for as we have always taken a lead in pressing for this S. India Branch it was most regrettable that the Association was not represented at all at its first meeting.

A report of that meeting was published in the *Planters' Chronicle* of the 29th January. Rules were framed and passed, and it is clearly stated that only Estates which are members of the R. G. A. will receive information from the Research Department.

Read correspondence under cover of U. P. A. Circle No. 19/16 and between Honorary Secretary and Secretary of the U. P. A. S. I. from which it appears the Ceylon Rubber Research Scheme, which is connected with the Ceylon Government Agricultural Department has from 1st January 1916 been amalgamated with the Malaya Rubber Research Fund and the Rubber Growers' Association and results of all research work of these will be available to Estates joining the R. G. A.

A copy of the Bye-laws of the R. G. A. was laid on the table and for the information of the members not present rule as to subscriptions payable by Estates is given.

Bye-law 3 (A) In the case of a corporation which is the proprietor of a rubber estate, the subscription shall be based on the crop of rubber produced

in the twelve months covered by the Directors Report last issued prior to 1st January of the year in which the subscription is due. The following scale shall become operative on and from 1st January 1916.

No output ... £10-10-0
Up to & not exceeding 100,000, 15-15-0

and for every additional 100,000 lbs. £5-5-0 up to a total of 50 guineas.

On and after 1st July 1917 an additional Entrance Fee of ten guineas will be charged.

Resolved,—That all members urge on their Proprietors the great benefits to be derived from joining the Rubber Growers' Association and ask them to join, advising the Honorary Secretary as soon as possible of the result so that he may inform the Secretary of the S. I. Branch of the R. G. A. to enable him to know what funds will be available for research work in South India.

270. *Registration of Carts.*—Read letters from the Honorary Secretary to the Collector of Malabar, chief Secretary to Government of Travancore and Dewan of Cochin in terms of Minute No. 237 of last Meeting and replies; from Dewan of Cochin asking further information, from Chief Secretary Government of Travancore advising that after consultation with Commissioner of Police and Commissioner of Devicolam his Government regretted they could not pass a Regulation of the kind required, and from Collector of Malabar advising the considered proposal too Teutonic. Recorded.

271. *Scientific Department Guarantee Fund.*—With reference to Minute No. 239 of last meeting the Honorary Secretary reported he had received no further promise of support to this.

272. *Pest Act.*—The Meeting noted with satisfaction that a Draft Bill has been prepared and hopes same may shortly become law, and would only suggest amendment of Section 6 in accordance with resolution carried at meeting held this morning.

273. *Director of Agriculture.*—Read letter from Honorary Secretary to Mr. Chadwick, I.C.S, in terms of Minute No. 238 of last meeting and his reply. Recorded

274. *Labour Conditions.*—Read U. P. A. S. I. Circ. No. 10/15 and 18/16 with connected papers. The Meeting consider no action necessary.

275. *Timber Valuation in Travancore.*—The Honorary Secretary reported that considerable correspondence had passed on the question of new proposals by the Travancore Government in respect to the value to be paid for timber on lands taken up for planting. The valuation according to Rules proposed made taking up of further lands for planting impossible. A deputation of Travancore Planters interviewed the Dewan of Travancore and arrived at the following working basis, (1) On lands applied for, if the Government who must give a decision within six months decide they cannot exploit the timber themselves, then the land shall be sold for Rs. 25 per acre plus the value of the timber used by the purchaser for building purposes, (2) On lands on which Government decide to exploit the timber they agree to remove the trees from 200 acres per year, the purchaser having the right to take on payment such timber as he requires for Building purposes. Recorded.

276. *Factory Acts.*—Read letter from Mr. Norman, Manager of the Cochin Rubber Company, giving cover to Order dated 9-5-91, P. R. 11-4-91 of the District Magistrate, Cochin State, in which he calls the attention of Mr. Norman to the fact that it is contrary to the provision of

Section 7 (1) of Regulation VII of 83 to work a Factory on a Sunday and ordering that the practice be stopped forthwith. Read letter from Honorary Secretary to Dewan of Cochin.

Copies of the different Factory Acts were Acts were laid on the table, *viz.* In British India ... Act XII of 1911
Travancore ... Regulation V of 1089
Cochin ... do VII of 1083.

Under all of these, Factories on Indigo, Tea and Coffee Estates are excluded. Under the Travancore Regulation, Factories on Rubber and Cardamom concerns are also excluded. Under the British Act and Travancore Regulation any Factory not employing 50 or more coolies on any one day is excluded, but owing to a different arrangement of the wording, this is not the case in Cochin if the Factory contains mechanical power.

The Honorary Secretary's letter to the Dewan was approved and it was resolved to leave the matter in the hands of the Honorary Secretary to take further action if necessary on receipt of reply. He was instructed to address the Hon'ble Mr. E. F. Barber in regard to the Act XII of 1911.

277. *Cochin Harbour.*—Read U.P.A. Circ. No. 16/15. Recorded. The Association hope that Government have been able to obtain a suitable dredger and to continue dredging operation.

278. *Vaighay Valley Railway and Madura-Bodinaickanur Railway.*—Recorded U.P.A. Circs., Nos. 11 & 14/15. Members present did not think there was any possibility of any sum being available from Planters belonging to this Association for the financing of this.

279. *European Association.*—Read letter from Honorary Secretary, Madras, Branch E.A. and reply. Recorded.

280. *Cocoanut Planting.*—Read letter from Mr. S. E. Farwell, Boston, U.S.A., and Honorary Secretary's reply to which members had nothing to add. Recorded.

281. *Shipping Freights Rubber.*—Honorary Secretary informed the meeting freights from Cochin, January were on Rubber.

Via Colombo	...	122*s*
,, Bombay	...	150*s*.
,, Madras	...	132*s*. 6*d*.

Railage from Cochin to Madras approximately 37*s*. 3*d*. all per 50 c. ft.

282. *His Excellency Governor of Madras.*—Should His Excellency when touring the Planting Districts, visit the West Coast the Honorary Secretary was instructed to make the necessary arrangements.

283. *Office Bearers 1916.*—The following were elected :—

Chairman	...	Mr. Campbell Hunt.
Committee	...	Mr. A. H. Mead, Mr. A. C. Morrell.
Honorary Secretary	...	Mr. E. H. Halliley.

784. S. *I. Branch Rubber Growers' Association.*—Mr. A. H. Mead was unanimously elected as the Association's representative on this.

215. *Combined Travancore Planters' Association.*—Mr. A. C. Morrell was unanimously elected as the Association's representative on this.

With a vote of thanks to the Malabar Club for the use of the room and to the retiring Honorary Secretary and Chairman, the proceedings terminated.

(Signed) A. C. MORRELL,
Chairman.
(,,) H. WADDINGTON,
Honorary Secretary.

Travancore Combined Planters' Association.

The second Annual Meeting of this Association was held at the Quilon Club, on Saturday, the 19th February, 1916.

PRESENT.—Messrs. A. J. Wright, Kanan Devan Hills Planters' Association, W. H. J. Milner, Central Travancore Planters' Association, J. Mackie representing Messrs. Harrisons & Crosfield Limited, and J. A. Gwynne, Honorary Secretary. *Visitor.*—Mr. E. Lord.

Notice calling the meeting was read and the Agenda was as follows:—

Minutes of last Meeting,
Accounts for year ending 31st December 1915,
Honorary's Secretary's Report,
Election of Office Bearers for ensuing year,
Report of Deputation to Government on Forest Land Regulations.
Registration of Carts,
Alterations to Rules,
Subjects for Sri Mulam.

In the unavoidable absence of Mr. Richardson, the Chairman of the Association, Mr. A. J. Wright was elected to the Chair.

The minutes of the last Annual Meeting and those of the meeting held on the 11th December 1915 were confirmed.

The accounts for the past year as follows were adopted.

INCOME AND EXPENDITURE ACCOUNT FOR 12 MONTHS ENDING 31ST DECEMBER, 1915.

	Rs.	A.	P.		Rs.	A.	P.
Postages ...	5	0	0	Subscriptions: 11 members @ 25 ...	275	0	0
Stationery ...	37	11	2	Interest ...	1	13	0
Clerk's Salary ...	25	0	0				
Excess of Income over Expenditure carried to Balance Sheet ...	209	1	10				
Total Rs...	276	13	0	Total Rs...	276	13	0

BALANCE SHEET, 31ST DECEMBER, 1915.

	Rs.	A.	P.		Rs.	A.	P.
Income and Expenditure account Balance 31st December, 1915 ...	209	1	10	Subscription in arrears...	50	0	0
				Cash with Messrs. Harrisons and Crosfield ...	159	1	10
Total Rs...	209	1	10	Total Rs...	209	1	10

19th February, 1916, Audited and found correct.
(Signed) J. L. HENDERSON.

(Signed) J. A. GWYNNE,
Honorary Secretary.

THE HONORARY SECRETARY'S REPORT.

Gentlemen,

This constitutes the Second Annual Meeting of this Association. The accounts which are before you show a credit balance of Rs. 209-1-10.

All Planters' Associations in Travancore and all Commercial Firms in Travancore who are interested in the planting industry are members of this Association. The total membership is eleven *i. e.*, 5 Planters' Associations and 6 Commercial Firms.

At the last meeting held on 15th December a Deputation was appointed to meet the Dewan on the matter of the Forest Land Regulations. The report of the meeting will shortly be read to you as also the conclusion arrived at by Government which have been forwarded by the Chief Secretary.

The resolution regarding the Registration of Carts was also submitted to His Highness' Government, and I regret to say it has not been found expedient by Government to enact a law requiring the Registration of all Carts.

The question of Standard Weights and Measures is still under the consideration of Government.

I regret that our Chairman Mr. Richardson is not with us to-day and I have to inform you that he has sent in his resignation, which I lay before you. Our cordial thanks are due to Mr. Richardson for all the trouble he has taken, and the time he has spent in the interests of this Association.

I beg to tender my resignation as Secretary.

The election of the Office Bearers for the ensuing year was proceeded with, and Mr. Richardson was elected Chairman, Mr. J. B. Cook, Vice-Chairman, and J. A. Gwynne, Honorary Secretary.

FOREST LAND REGULATIONS.—The Chairman's Notes of the Deputation's visit to the Dewan were laid on the table, as also the conclusions arrived at by Government. As the former had been circulated to the Secretaries of District Associations it was decided to have the letter printed and circulated also, and to call for comments to assist the Executive Committee to formulate an adequate reply to Government.

REGISTRATION OF CARTS.—The reply from Government to the resolution of this Association asking for an enactment requiring the registration of all carts was read. This was considered unsatisfactory, and it was proposed and carried to again represent this matter to Government.

ALTERATIONS TO RULES.—The proposed alterations to the Rules making voting provision for the Planting Member of the Travancore Legislative Council were adopted.

SUBJECTS FOR SRI MULAM.—The subjects for presentation to the Sri Mulam were discussed and the meeting thereafter closed with a vote of thanks to the Chair.

Sheveroy Planters' Association.

Proceedings of a Special General Meeting of the Sheveroy Planters' Association, held at the Victoria Rooms, Yercaud on Tuesday 22nd February 1916.

PRESENT.—Rev. Father Capelle, Messrs. E. Travers-Drapes, V. Travers-Drapes, Miss Gompertz, Messrs R. A. Gilby, S. M. Hight, A. B. Kundaswamy, C. G. Lescher, E. L. Poyser, C. Rahm, W. Rahm, and Charles Dickins (Honorary Secretary).
Mr. A. G. Nicholson by his Proxy., Mr. E. Travers-Dravers (Visitors.) Mr. F. Carey (Chairman, Yercaud Union) and Mr. Fitzpatrick.

1. *Notice Calling the Meeting.*—The notice calling the meeting was taken as read.

2. *With reference to Bees and Coffee Pollination.*—Read and recorded letter No. 48, from D.F.O. South Salem.

3. *With reference to closing all the Sheveroy Arrack Shops.*—Read letter No. 4126 dated 4th February 1916, from Collector and District Magistrate, Salem, stating that he has decided to try the experiment of closing all the Sheveroy Arrack Shops for next lease beginning April 1916. The success of the experiment depends on whether it is possible to detect and defeat any attempt to bring in illicit supply. He also invites the co-operation of all members of the Association for this end and to send him the earliest information if they have reason to suspect that illicit trade is being carried on.

The Honorary Secretary informed the meeting that he promptly thanked the Collector and District Magistrate for the information conveyed in his letter of 4th February, at the same time assuring him that the Association would render all help it could to stop the carrying on of any illicit trade.

The step taken by the Honorary Secretary was approved of

4. *The Water Hyacinth or* "LILAC DEVIL".—Read pamphlet from Department of Agriculture, Madras with reference to the above.

The Honorary Secretary was instructed to thank Mr. Chadwick for his information.

5. *Coffee Stealing Case.*—Read letter dated 13-1-16 from Mr. J. C. Cobbe informing the members of the Association that his maistry was convicted for stealing coffee off his drying tables and sentenced to a fine of only Rs. 5 or one week's imprisonment.

The Honorary Secretary was instructed how to act in the matter.

6. *Motor-Car Shed, Salem Station.*—Read letter dated 13th February from Mr. E. L. Poyser. With reference to the above, it was proposed by Mr. Poyser, seconded by Mr. S. M. Hight and carried unanimously.

That the Honorary Secretary be requested to write to the Railway Authorities asking them whether they would be willing to build a shed to accommodate say two motor-cars or cycles at Salem Station in which the cars or cycles owned by passengers travelling on the line could be accommodated during their absence, on payment of a daily storage fee.

7. *Pest Act.*—Read Circular No. 15/15, dated 4th December from Secretary U. P. A. S. I., the Bill, and Mr. Anstead's letter.

The following was suggested :—in Part II, No. 6 :—

"With the necessary Scientific qualifications" be added after "any officer," and the following resolution unanimously carried.

> "that this Association is prepared to accept the proposed Pest "Act with this proviso Section 10 (1), provided that if the owner "or occupier of land growing an infected tree or plant, or tree or "plant-liable to infection-objects to any action taken under Section "10, (1), he may have the right to appeal to the Collector and have "the opinion of the Inspecting Officer confirmed or revised by the "Head of the Scientific Department, and on the understanding "that Government on their part will make the Act applicable "to all Government lands in the neighbourhood of Estates."

Lantana :—The Honorary Secretary was instructed to write to the Planting Expert for an authoritative ruling as to whether Lantana will be included under the Pest Act as one of the pests to be eradicated, as it will effect this District very vitally.

(Signed) CHARLES DICKENS,
Honorary Secretary, S. P. A.

LUMINOUS INSECTS.

(*Continued.*)

Undoubtedly the chief function of the light is in securing the mating of the sexes, but that this is a secondary function only is evidenced by the different degree to which the use of the light is developed. Its wide occurrence within the family proves that the power of emitting light must have arisen early in the evolution of the family, though exactly how it originated, it is impossible to say. Possibly, it may have served at first as an indication of unpalatability, common to both sexes, and then coming under the influence of sexual selection as an evolutionary force, have developed along various lines we see indicated. In connection with their unpalatable qualities, it may be noted that the Lampyridae is a family that has many mimics in other families of beetles, amongst the Telephoridae, for example, and the longicorns. Species of the longicorn genera Amphionycha and Dadoychus even go so far as to have a ventral pseudo-luminous patch resembling the luminous patch of the fireflies, but in the allied genus Alampyris, where the dorsal mimicry is quite as close, this patch is lacking.

Apart from its principal function in securing the proper mating of the sexes, the light seems also to be largely used, at any rate by the males, for purposes of display. Where the powers of luminosity are largely developed in this sex the emission of the light is usually of an intermittent flashing type. It has been noticed in various parts of the world that these flashing males tend to congregate in large companies, and that all the individuals of one of these gatherings will flash in concert. All the fireflies around one tree or group of trees, for instance, will flash together, while those around a neighbouring tree will be pulsating to a different time. This feature has been observed of a European species of Luciola (though Mr. Main and myself were unable to detect anything of the sort with *L. italica* at Lugano), of an Indian lampyrid genus not stated, and of the genus Aspidosoma in South America. The American species of Photinus and Photuris do not seem to possess the habit.

The exact reason of this flashing in concert, or the method by which it is brought about, have not been ascertained. It has been suggested that the light is not really intermittent in character, but merely appears so owing to its being alternately masked and exhibited by movements of the creature's body, and that a slight puff of wind might perhaps affect all the members of a company and cause them all to conceal their lights at once. Though this explanation of the intermittent character of the light applies well enough to Pyrophorus, an insect we shall shortly consider, it is certainly not applicable to these Lampyridae. It is true the light is not extinguished between the flashes but it is so diminished as to become practically dark; moreover, the flashing in unison is too regular to be caused by chance puffs of wind. A more probable explanation of the phenomenon is that each flash exhausts the battery, as it were, and a period of recuperation is required before another flash can be emitted. It is then conceivable that the flash of a leader might act as a stimulus to the discharge of their flashes by the other members of the group, and so bring about the flashing concert by the whole company.

The physical and chemical nature of the light of these insects have been the subject of numerous investigations. Though often spoken of as "phosphorescent," the light has nothing whatever to do with the oxidation of phosphorus.

The most recent conclusions are those of Dubois, and were summarised by him in a communication to the Zoological Congress at Monaco in 1913. He finds that the mechanism for the production of light is the same through-

out for both plants and animals, and is the result of the action of an oxidising zymase, upon an organic proteid product in the presence of water. In the case of luminous insects the proteid, which he calls *luciferine*, is contained in the form of granules in the photogenic organ, while the zymase, to which he applies the name luciferase, is dissolved in the blood. The light is given off by the action of the luciferase on the luciferine as the blood passes through the luminous organs. This zymase can be replaced experimentally by a chemical oxidising agent such as permanganate of potash, lead dioxide, hydrogen dioxide, etc.

The luminous organs in these insects are found on dissection to be abundantly supplied with tracheæ, which open by means of very large spiracles. It is probable that by opening or closing these spiracles the insect is able to regulate the supply of oxygen to the luminous organs, and so in some degree to control the emission of light.

Though in many species the flashing of the female is so regular as to suggest its being due to reflex rather than to voluntary action, yet in the female the light appears to be more under the control of the insect. In many species the light may be emitted after the death of the insect but in the case of males of the flashing species the light is then constant instead of intermittent and less intense than in life. While searching for the females of *Luciola italica* I was several times deceived by the constant faint light of a dead firefly caught in a spider's web near the ground.

Another group of beetles the light-giving properties of which have caused them to be very widely known—at any rate by name—are the "fireflies" of tropical America, Pyrophorus. These must not be confused with the "fireflies" of Italy and southern Europe, which, as I have said, are really winged glow-worms allied to the lightning-bugs of the United States. The fireflies of tropical America and the West Indies, the creatures that the local belles wear in their hair, and about their persons, as a kind of living jewelry, known locally as Cucujos, belong to a very different family, the Elateridae, or skip-jacks. They are considerably larger than the glow-worms, and their light organs are differently situated. The most obvious are a pair of large yellowish spots on the thorax, one near each of the posterior angles. If the beetle is examined alive, these spots, the "eyes" as they are called, will at first be quite dull and opaque; but when the insect is handled they will soon be observed to kindle, the glow increasing gradually in intensity until it reaches its maximum. This light is only emitted by the firefly when stimulated by some excitement, such as that caused by handling, and glows steadily so long as the excitement continues; as this wanes, the light gradually dies away.

When the insect is on the wing the light seen is not that emitted from these eye-spots, but originates from another light organ at the base of the abdomen. This organ is usually concealed between abdomen and thorax, and is only exposed when the elytra are open so that the abdomen can be bent back. The light is of a redder, or yellower, colour than that emitted from the thoracic spots; and is intermittent instead of continuous, the flashes being caused by slight movements of the abdomen, whereby the light is alternately concealed and exhibited. The bionomic value of the light in these insects is not at all understood, but it does not seem to have any sexual function in this case.

The larvae of these fireflies are also luminous. They are of typical elaterid form and live in rotten wood. In the young larvae the light is emitted from the junction of the head with the body, but in the older larvae it is emitted also from the junctions of segments all along the body. The eggs also are stated to be luminous.

Various beetles of other families have been recorded as luminous, but all these records want confirmation, and some of them were certainly only accidental.

To sum up, nearly all the cases of luminous insects, and *all* those that are in any way well known and common, belong to the order Coleoptera, and even here almost entirely to the family Lampyridae. An exception to this statement is found in the elaterid genus Pyrophorus, but other records all require confirmation. In the Lampyridae the light plays an important part in securing the mating of the sexes, but its functions in other luminous beetles have not been satisfactorily explained.

In other orders of insects luminosity is rarely met with, at any rate in the normal condition of health; little or nothing is known of the part that it plays in the life of the animal; indeed its very existence apart from what we may call accidental causes, is usually more or less problematical.—*Nature.*

SOUTH INDIA PLANTERS' WAR FUND.

	Rs.	A.	P.
Amount previously subscribed	36,491	11	9
Mrs. Leeming	50	0	0
Mr. H. L. Pinches	80	0	0
,, A. G. Murray	20	0	0
,, G. W. Cole	20	0	0
,, C. Fraser	60	0	0
,, W. Fraser	20	0	0
,, E. C. Kent	80	0	0
,, S. Bayley	10	0	0
Total ..	36,831	11	9

OVERSEAS AIR CRAFT FUND.

	Rs.	A.	P.
Amount previously subscribed	4,593	14	0
Mr. H. L. Pinches	50	0	0
Mr. A. G. Murray	50	0	0
Mr. G. W. Cole	20	0	0
Total Rs...	4,713	14	0
Interest accrued	35	10	9
Total Rs...	4,749	8	9
Remittance to England £296-15-7 @ 1/4 1.8	4,417	2	9
Balance Rs...	332	6	0

If you wish to test the purity of tea, use an ordinary table knife and a sheet of white paper, upon which a small quantity of the tea to be tested is placed. The tea is then rubbed with knife. When the leaves have been reduced to a powder the paper is dusted clean with a brush made of common bristles and its surface examined with the naked eye or a microscope. If the tea is artificially coloured, little spots or streaks of vivid Prussian blue will appear in the fibre of the paper. These stains are so distinct in their colouring that they cannot possibly be confused with any other stain that may be in the paper.—*Indian Planters' Gazette.*

The Planters' Chronicle.

RECOGNISED AS THE OFFICIAL ORGAN OF THE U. P. A. S. I., INCORPORATED.

(Secretary's Registered Telegraphic Address "Planting," Bangalore.)

VOL. XI. No. 11.] MARCH 11, 1916. [PRICE AS. 8.

THE U. P. A. S. I.

(INCORPORATED.)

Contents.

The Scientific Department publishes an article which contains paras on 'Manuring of Tea, Pruning Tea, and an extract from Mr. Bryce, Assistant Botanist and Mycologist, Ceylon, on Nodules in Hevea.'

An article on War and its Relation to Rubber Planting by Stanley Arden, F. L. S. taken from the *India Rubber Journal*, should be read with interest by all Rubber Planters. The whole article appears to us replete with sound common sense.

The Director of the Labour Department inserts a short notice referring to marriage, customs and seasons. Especially with reference to the Salem and Coimbatore Districts. The Director, who hopes to return to Bangalore about the middle of this month, asks us to notify to all subscribers to the Department that all Labour Matters connected with the Coimbatore Division should not be addressed in future to the Director by title or by name, but to H. Meerwarth Esq., or the Acting Deputy Director, Coimbatore.

Mr. Chadwick's leaflet on the "Water Hyacinth" is a warning and is an appeal to all to help to exterminate this prolific and noxious weed.

"Green Bug sends" in a page of Odds and Ends and we hope to publish more from him. A letter from F. W. F. F. will appeal to all planters. We wish that the Cordite Factory could see its way to meet his suggestion.

SOUTH INDIA PLANTERS' WAR FUND.

				Rs.	A.	P.
Amount previously subscribed	...	...	...	36,831	11	0
Mr. J. Harding Pascoe ...	...		...	500	0	0
„ John Christie ...	...		...	500	0	0
		Total	...	37,831	11	0

OVERSEAS AIR CRAFT FUND.

				Rs.	A.	P.
Balance	...		...	332	6	0
Remittance to England £15-12 @ 1/4 1/8		Rs. 232	4 0			
Postages, Bank Discount and Receipt Stamps ...		.. 20	2 0			
				252	6	0
		Balance Rs...		80	0	0

SCIENTIFIC DEPARTMENT, U. P. A. S. I.

Green Manuring of Tea.

The benefits to be derived from the use of Green Manures have frequently been pointed out in these pages, more especially the use of *Dadap* on Tea estates. (See *P. C.* X. p. 497; XI. p. 14) In his *Annual Administration Report*, the Director of Agriculture, Ceylon states that the Perideniya experiments have demonstrated the fact that the yield of Manipuri indigenous tea interplanted with *Dadap*, which was lopped and used as a green manure, rose in seven years (1907—1913) from 767 lbs of made tea per acre to 1,760 lbs, while that of the control, manured with phosphoric acid and potash only, rose in the same period from 700 lbs to 1,240 lbs. It is pointed out that green manures have a great value in reducing the size of the manure bill when suitable trees are chosen and intelligently managed.

Pruning Tea.

An experiment has been conducted on five acre plots of Manipuri indigenous tea at the Perideniya Experiment Station, Ceylon, to determine the effect of leaving a live branch on each bush at pruning time. The branch retained was plucked regularly and yielded an average of 118 lbs of made tea per acre during the period the bushes were otherwise out of bearing, January to April, equal to 11% of the total crop for the year. The effect of retaining the live branch on subsequent plucking of the bushes showed an increased yield of 5·78%, and 11·85%, and 7·76% on three plots during the nine months they were in bearing.

Nodules in Hevea.

Mr. Bryce, the Assistant Botanist and Mycologist, Ceylon, is making a special study of the burrs and nodules formed on the stems of Hevea Rubber. He reports as follows in the *Ceylon Administration Report for 1914*, just issued. "In the great majority of nodules examined there" "was a central core of latex tubes containing caoutchouc. With these" "occur a few layers of cells of the original cortex, some of which have a" "dark brown or blackish compact content. Similarly coloured streaks" "occur apparently in intercellular spaces. A few nodules had no discern-" "able central core of latex tubes. The walls of the latex tubes and" "accompanying cortical cells gave the lignin reaction with various stains." "The brown decolouration appears to be due to a tannin which has" "undergone some change. It is insoluble in 90% alcohol and resembles" "somewhat closely the product formed by the action of potassium" "bichromate on the tannin of normal Hevea bark. Nodules were" "collected from an untapped healthy tree which had no central core of" "latex cells with their accompanying cortical cells."

"On an old Hevea tree in the Royal Botanic Gardens, Perideniya," "dead nodules were found in process of being shed in the dead scales of" "bark still adhering to the tree. Other nodules were observed in living" "connection with the cortex at only one small point of the surface. This" "would indicate that nodules are in certain cases shed in the normal" "shedding of bark. The conditions leading to the formation of nodules" "in Hevea bark are still obscure."

RUDOLPH D. ANSTEAD,
Deputy Director of Agriculture, Planting Districts.

RUBBER.

The War and its Relation to Rubber Planting.

BY

STANLEY ARDEN, F. L. S.

The Effect of the War on the Rubber Industry.

It is very difficult to foretell with any degree of accuracy what will be the economic position that will obtain after the war. On the one hand we are told that there will be a period of very severe depression, and that the effects of the war will be felt a hundred years hence. On the other hand, the *Statist* declared a short time ago that: "If the belligerent nations become increasingly efficient and hard-working in consequence of the discipline of war, the expansion in the world's productive power and in its accumulated capital after the war is over, may indeed be so great that the vast amount of wealth now being destroyed will be rapidly recovered, and it may be that the economic effects of the war will disappear sooner than anyone now ventures to hope or dares to calculate." I lean towards the latter opinion, which is merely the case for National Service restated, but it is probable, however, that neither opinion is *wholly* correct. It is conceivable that some professions and trades will be much more adversely affected by the war than others. For instance, the building trades and the various forms of Art will no doubt be seriously affected, while engineering and shipbuilding industries, owing to the accumulation of orders during the war, will experience a very prosperous time. So far as the rubber industry is concerned, much depends upon whether the present demand for rubber can be said to be abnormal—*i.e.*, is it due to the war, and will the demand cease with hostilities?

The Demand.

It is probable that there is sufficient rubber in existence to meet present requirements, notwithstanding the exceptional demand that has sprung up in America, where it is estimated that over a million motor cars will be built during the ensuing year, and the recent rise in price is no doubt largely due to the shortage of shipping facilities and the lack of labour at the docks. For some years the "luxury demand" (motor cars, sporting goods, etc.,) in Europe may be curtailed owing to heavy taxation and high cost of living. This will probably be more than counterbalanced by the increase in the "utility demand," notably the fillip which will be given to mechanical transport throughout the civilised world, owing to the dearth of horses.

The Supply.

If the future demand is somewhat problematical we are on much safer ground when discussing the supply. *The supply of plantation rubber will be more than doubled within the next five years*; in addition the present high prices will undonbtedly stimulate the collection of "wild rubber." Many estimates of supply and demand have been made (some more erroneous than others), but the gloomiest of these need not cause shareholders in sound concerns the least alarm. I do not, of course, refer to those who purchased their shares at an unwarrantably high premium. The price of rubber will be regulated by the old law of supply and demand. The production of plantation rubber for 1910 was 8,000 tons; for 1915, 96,000; for 1920 it will be at least 200,000 tons. Whether demand will keep pace with supply it is impossible to say, but it would be prudent, but by no means imperative, to anticipate a price far below that ruling in the ante-bellum period.

The Policy of Thinning Out.

The best antidote to a low selling price is a low producing price, and this can best be attained by a judicious system of thinning out, thereby reducing the cost of production to a minimum. In doing this, what we have to aim at is not the maximum yield per tree, nor yet the maximum yield per acre, but the maximum yield at the minimum cost. Lack of experience prevents us from reaching a definite conclusion as to the number of permanent trees to be left per acre, and opinions on this point vary greatly, ranging from 30 trees to three times this number. Taking everything into consideration, I think about 60 trees per acre, will give the most satisfactory results; but this number is by no means arbitrary. On very rich soil, where the growth of the trees is vigorous, perhaps 50 trees will be sufficient. On poor soil, or where for any reason the growth of the trees is below the average, possibly 70 to 80 trees per acre may not be too many. Having decided upon the number of trees, the most productive should be selected, irrespective of their position (symmetry being of a secondary consideration); and after having marked these with a broad white band so that they will be easily distinguishable, every attention should be given to their cultivation. The future of the estate being bound up with the question of thinning out, it is imperative that the greatest care should be taken in selecting the permanent trees. The work should be done by the Manager, or one of his chief assistants, ***at the time tapping operations are in progress.*** The trees to be cut out should include those that give a poor yield of latex, those whose latex is deficient in caoutchouc, trees of inferior growth which will probably have a poor bark renewal, forked trees which are liable to split during high winds, and trees which are growing at such an angle as to make tapping difficult.

The Cultivation of Selected Trees.

A small trench (say six inches wide and twelve inches deep) should be dug round each selected tree at a distance of 15 ft. (if possible) from the two. This trench will keep the roots of the "condemned" trees from encroaching, will keep the roots of the "selected" trees within bounds, where they will be able to take full advantage of any manure which may be applied and will induce the formation of surface roots, the true feeders, owing to the root pruning which will occur, consequent upon digging the trench. The ground inside the trenches should be forked over annually (not dug) to a depth of 6-9 inches. In order to aerate the soil, thus converting the plant food present in the soil into a form in which it may be readily assimilated.

Manuring.

As regards manuring, we are very much in the dark, and the Agricultural Departments of Ceylon and Malaya have not shed much light on the subject. As a rule lime may be applied with advantage to those soils which are rich in plant food, being especially valuable when applied to soils containing a large amount of vegetable acids. It must not be forgotten, however, that lime itself is not a manure.

> "Lime and lime without manure,
> Will make the farm and farmer poor."

On poorer soils, if quick returns are wanted, sulphate of ammonia is perhaps the best manure to use. This is preferable to nitrate of soda, which is too soluble to be used in the tropics. Patent manures should never be used, as they almost invariably contain sand, some as much as 70 per cent. When the tree has reached the age of ten or twleve years, possibly a complete manure, one containing nitrogen, phosphoric acid, and

potash) would be preferable to a purely nitrogenous manure, but we are only concerned now with growing the best producing tree. Organic stable or less soluble manures should form part of any manurial mixture.

Pruning.

If necessary the tree should be carefully pruned; horizontal branches must be sawn off, or at least reduced so that there is no fear of them breaking down and injuring the tree. The exposed surface must be treated with "Jodelite" to prevent parasitic growth of any kind. It would certainly be beneficial to the tree to cut off the flowering shoots, thus preventing it from forming bud, though I am not quite sure that this is practicable.

Thinning Out by Degrees.

Thinning out is a proved necessity, and it would be obviously absurd to delay this operation until the effects of overcrowding are apparent. Usually the work should be taken in hand when the trees are about eight years old, though this should depend upon the rate of growth, but it should always be undertaken *before* the trees suffer from the lack of space. Assuming that there are 120 trees per acre. I would suggest that these be reduced by 30 when the trees have attained the age of eight years, a further 15 when twelve years of age, in every case selecting the most unprofitable trees. If thinning out is conducted in this manner, we may look for a steadily increasing yield at a decreasing cost.

Tapping.

I do not recommend that the selected trees should remain untapped (though the tapping should be of a very light nature), as it seems just possible that the development of the lactiferous tissue will be stimulated by tapping. This is only a supposition, but in any case, on the principle of "a bird in the hand," etc., it seems foolish to suggest that while rubber is selling in the region of 3*s*. 8*d*. a lb., the trees should remain untapped on the offchance that they will give a better yield when rubber is perhaps selling at 1*s*. 6*d*. per lb. It is gradually being recognised that the quarter section is preferable to the V system of tapping; though, in spite of the demonstrated superiority of the sectional systems, the latter method is still being employed on many estates. I think it still remains to be proved, however, whether one, two, or three cuts should be made into the vertical channel. As stated above, what we have to aim at is the maximum yield with the minimum labour and it is obvious of course that 300 lb. of rubber per acre at a profit of 1½*d*. per lb. is preferable to 400 lb. at 1*d*. per lb. profit. With the present high prices the cost of production is not so important, but it is conceivable that the selling price may fall to such a figure that the system of tapping adopted may make all the difference between tapping at a loss or at a profit.

Much has been written on the economy of bark consumption. The importance of this cannot be too greatly emphasised when dealing with the selected trees, though the question seems to lose much of its force when applied to trees which it is intended to cut out in a few years' time.

A Plea for Data.

I cannot refrain from pointing out here what valuable data may be collected by managers at a very small trouble, if the selected trees are tapped on the quarter section system, with one cut, and the "condemned" tree on the same system, but with two or three cuts, and the yields compared. Much valuable information might also be obtained in regard to

the *frequency* of tapping by tapping the "condemned" tree daily, and the "selected" trees on alternate days. Experiments made by the Agricultural Departments are necessarily made upon a limited number of trees, growing under very varying conditions, and anyone who has had experience in tapping knows that for no apparent reason the yield of latex from trees growing even under the same conditions, varies so much, that unless the experiments are conducted upon a large number of trees for a long time, such data is unreliable.

The Responsibility of Directors.

I doubt very much whether many directors of rubber companies realise the great responsibility which rests with them in the policy of thinning out. The rule-of-thumb method which obtains on many estates, *viz.*, that of tapping every alternate tree "to death" and then cutting it out, must cease. It will be poor consolation for shareholders in rubber companies to learn—say a few years hence—that they have a pretty estate, and that it is in first-class condition, but owing to the low price of the commodity and the shortsightedness of the directors, rubber cannot be produced at a profit.

Estimated Yield.

From trees selected and treated as I have advocated, I anticipate a yield of at least 7 lb. per tree per annum, *i.e.*, 420 lb. per acre when the trees are ten to twleve years old. Not all estates will yield this; on the other hand, many estates in the F. M. S. are now producing more, although the average age of the trees is much less. The "all in" costs from trees yielding this amount ought not to exceed 9½*d.* per lb. With rubber selling at 1s. per lb. this gives profit of 2½d. per lb., or £4-7*s.* 6*d.* per acre, which is sufficient to pay a dividend of 10 per cent. on an acre capitalised at £43-15*s.*

To Summarise.

(1) Thinning out being a proved necessity, this work ought to be taken in hand *before* the effects of overcrowding are apparent.

(2) The greatest care should be exercised in the selection of the permanent trees.

(3) The cutting out of the condemned trees should be done gradually, beginning with the most unprofitable ones.

(4) Every attention should be given to the cultivation of the selected trees.

(5) They should only be tapped very lightly, say with a single incision on alternate days.

Conclusion.

I do not anticipate that rubber will ever be selling at 1*s.* a lb. for any length of time—the mention of this figure merely emphasises the inherent soundness of the industry—for although a combination of adverse circumtances may drive it down to that price, it seems impossible that it should remain so low for long. If, however, it comes to a struggle for the survival of the fittest, those estates which have paid due attention to the policy of thinning out, and have thus reduced the cost of production to the lowest possible limit, will be found among the fittest.—*The India-Rubber Journal.*

LABOUR DEPARTMENT.

For sometime the question of coolies from Coimbatore and Salem Districts wanting to return to their villages in March has engaged my attention. During the last few weeks I have collected information on the subject very particularly.

Both enquirers and informants agree that it is an inheritance from the Coffee days, and is largely a Mamul.

It is also the marriage season in those districts. A valued informant suggests that a system of monthly payments would be a great help as leave could be given to coolies during the year, when they were free of debt, according to the needs of Estates, on condition the coolies remained over March, April, May, until the monsoon checked Tea flush. By degrees the custom of going to the villages in the middle of June and returning on 1st September could be established.

As regards marriages, some places have succeeded in encouraging these domestic occurrences with the natural little consequences, taking place on the Estates, and perhaps the adoption of this practice may be possible elsewhere.

I think also that March April May are considered unhealthy in some districts, and the remedy for this is medical attention.

I have hitherto and until quite recently been under the impression that certain crops required the services of coolies in their villages during those months, but this is not the case in Coimbatore and Salem Districts to the extent of justifying the general exodus of labour from the Estates in March as is now the case.

AYLMER Ff. MARTIN,
Director.

SOUTH INDIAN PLANTERS' BENEVOLENT FUND.

Subscriptions collected from 1st July 1915 to 29th February 1916.

	Rs.	A.	P.
Anamalai Planters' Association	350	0	0
Central Travancore Planters' Association ...	30	0	0
Coorg Planters' Association	230	0	0
Kanan Devan Planters' Association	435	0	0
Mundakayam Planters' Association	180	4	0
North Mysore Planters' Association	100	0	0
South Mysore Planters' Association	80	0	0
Nilgiri Planters' Association	195	0	0
West Coast Planters' Association	570	0	0
Shevaroy Planters' Association	110	0	0
Wynaad Planters' Association	40	0	0
Mr. Aylmer Ff. Martin (Personal subscription) ...	75	0	0
Interest accrued	558	11	1
Total...	2,953	15	1

We would call attention to the poorness of the above subscriptions, considering calls may be numerous after the war.—EDITOR.

WATER HYACINTH.

The following information has been published by the Madras Agricultural Department as Leaflet No. V of 1915 by Mr. Chadwick, the Director of Agriculture:—

"The subject of this leaflet is a very pretty blue flower known in English as the 'Water Hyacinth' or the 'lilac devil'. It is a native of the tropical portion of South America whence it has been introduced both into the United States and into Australia and is now to be seen in various parts of this Presidency. Anyone can easily recognise it by its extremely pretty mauve flowers and by its thick fleshy leaves. In spite, however, of its natural charm and beauty, it ranks among the enemies of mankind. It grows exceedingly rapidly in wells, ponds, rivers, channels, in fact wherever there is water. The leaf stalks are provided with bladders so that the leaves float and the plant can live whether in deep or shallow water. It can propagate itself both by seeds and suckers both of which are light and can be driven by the wind, but spreads especially rapidly by means of small lateral branches which occur in great numbers and from all of which new plants can spring. By its abundance of leaves, dense vegetation and the absorbing power of its roots it can most seriously impede the flow of water and even completely block up small ponds. In parts of America navigation on some of the rivers has been obstructed by the spread of this plant. In parts of Burma it has become so dense that it is being cut into large masses and dragged out to sea by steam tugs.

"2. Thus in tropical America this pest has spread so rapidly that it has been necessary to spend many thousands of pounds in endeavouring to eradicate it from rivers and streams. If it becomes at all common in our Presidency it may most grievously affect our water and irrigation supply on the preservation of which the economic future of the Madras Presidency and the health of its people so largely depend. Also it has been found in Chingleput that the close vegetation which this plant forms makes an ideal breeding place for mosquitoes. Thus alike from considerations of material profit and of general health all ought to combine to stamp out this pest.

"3. This is no empty warning because this pretty plant has been seen in Madras near the Adyar, in irrigation channels in South Arcot and Tanjore especially in the neighbourhood of Chidambaram and Mayavaram, in the moat at Chingleput and between that town, Conjeeveram and Wandiwash. In Mayavaram it can be found in some of the old wells. It has also been seen in many places in Malabar district and in the tanks in Moplah mosques.

"4. In the early stages of growth it is easy to lift it out dry, and burn. It is not enough to leave it to rot, because the seeds readily germinate in moist earth. Thus if anyone sees it anywhere in water over which he has any control, he ought to uproot it at once and burn it, Both in America and in Australia it is one of the most serious weeds with which they have to contend, and it is spreading dangerously in Burma also With the warning and the experience of these countries it ought to be possible to prevent its extension in the Madras Presidency. All gentlemen are requested to assist in eradicating this weed which if left to spread unchecked may cause serious economic loss. It flourishes chiefly in *stagnant freshwater.*"

It may be noted that this weed had made its appearance in the Ulsoor Tank at Bangalore before the latter was cleared out and it will be of interest to see if it will make its reappearance now that the tank is to be refilled. As no particular steps were taken to eradicate it is most probable that it will

RUBBER TRADE ASSOCIATION OF LONDON.

MONTHLY STATISTICS,

No 10.

IMPORTS of all kinds of Rubber into the United Kingdom.

From	January. 1916.	1915.	1914*
Straits Settlements and Federated Malay States ...	3,659	4,541	2,576
Ceylon ...	1,089	1,866	611
British India ...	236	216	—
Dutch East Indies ...	256	283	—
Brazil and Peru ...	926	306	1,264
Africa ...	332	419	24
Other Countries ...	100	95	1,523
Total Tons...	6,598	7,726	5,998

The Customs returns now give the Imports from Africa for December, 1915, as 427 tons, and the Total Import for the month as 5,411 tons. This will make the Totals for the year 1915:—Africa 3,794 tons and Total, 78,591 tons.

EXPORTS of all kinds of Rubber from the United Kingdom.

To	January. 1916.	1915.	1914*
Russia ...	225	329	710
Germany ...	—	—	826
Belgium ...	—	—	294
France ...	687	307	591
United States ...	2,176	342	1,588
Other Countries ...	750	911	375
Total Tons...	3,838	1,889	4,384

*Including Waste and Reclaimed Rubber.

IMPORTS, DELIVERIES AND STOCKS in London and Liverpool, January, 1916.

		Imports. For Jan.	Deliveries. For Jan.	Stocks 31st January. 1916.	1915.	1914.
London	Plantation ...	5,349	4,625	7,342	6,643	3,866
	Other kinds ...	90	101	178	731	765
	Total Tons...	5,439	4,726	7,520	7,374	4,631
Liverpool	Para ...	776	716	407	324	517
	Other kinds ...	152	172	258	371	1,026
	Total Tons...	928	888	665	695	1,543
Total Tons for London and Liverpool ...		6,367	5,614	8,185	8,069	6,174

Shipments from Straits Settlements and F. M. S.

	December.			Twelve Months ended Dec.		
	1915.	1914.	1913.	1915.	1914.	1913.
Tons ...	8,116	5,695	3,835	79,415	50,424	35,354

Shipments from Ceylon.

To	*December.	Twelve Months ended December. 1915.	1914.	1913.	1912.
United Kingdom ...	998				
Russia ...	—				
Germany ...	—				
Belgium ...	—				
France ...	79	20,153	16,176	11,834	6,321
U. S. A. ...	752				
Other Countries ...	40				
Total Tons...	1,869				

*Figures made up to December 31st.

U. S. A. Imports and Exports.

	October.			Ten Months ended Oct.		
Imports.	1915.	1914.	1913.	1915.	1914.	1913.
India rubber ...	7,814	5,751	3,785	79,429	53,233	42,685
Gutta and Balata...	878	534	1,185	11,563	9,498	18,370
Total Tons...	8,692	6,285	4,970	90,992	62,731	61,055
Exports.						
India rubber ...	200	246	132	1,800	1,830	1,676
Gutta and Balata ...	6	74	17	393	168	79
Total Tons...	206	320	149	2,193	1,998	1,755

Para Receipts.

	Jan., 1916.	July-Dec., 1915.	Total.
Rubber ...	3,200	14,070	17,270
Caucho ...	550	2,240	2,790
	Jan., 1915.	July-Dec., 1914.	Total.
Rubber ...	3,070	12,743	15,813
Caucho ...	490	1,552	2,042

6, Mincing Lane, E. C.,
11th February, 1916.

ODDS AND ENDS.

By "Green Bug."

The consumption of China Tea in Great Britain fell off by over a quarter of million pounds as compared with 1914. The amount of China Tea consumed in the United Kingdom last year was 12,779,972 lbs out of a total of 317,324,744 lbs. Russia continues to buy this kind of Tea largely, especially in the Hankow market.

The latest *Consular Report on the Trade of Hankow (1914)* says that the Chinese Government, which now and again makes an effort to revive the popularity of China Tea in home markets, instituted a slight reduction in the export duty on tea, but this reduction was insufficient to have any appreciable influence. It is generally stated that the only remedy for the decline in the tea trade would be the abolition of the export duty and the imposition of a constant rate of likin to be paid to the Maritime Customs at the time of export. This would obviate the lack of uniformity at present ruling in the matter of likin collection, a tax which fluctuates according to the fulness or otherwise of the purses of local officials, there being as many as six different rates in one single province.

The following figures of exports of Black Teas from Hankow are given in the Report :—

To—	1914.
Russia	28,500,000 lbs
London	13,000,000 lbs
United States and Canada ...	6,130,000 lbs
Continent of Europe	4,000,000 lbs
Australia	370,000 lbs
Total ...	52,000,000 lbs

According to the *Madras Mail*, the Southern India Chamber of Commerce has telegraphed as follows to the Hon'ble Sir William Meyer with reference to the new taxation :—" The Chamber welcomes your general revision tariff schedules, but wishes to emphasise greater need for consideration and sympathy towards small importers by Customs Office in application of penalties for misdeclaration of values and by reason of abolition of tariff values and introduction of *ad valorem* duty all round. The evil of incidence of taxation varying on similar goods has to be avoided. As regards No. 70 (fruits and vegetables) in the schedule, the Chamber urges the exemption of fresh fruits and vegetables from land custom. The Chamber would rather have export duty on wheat and oil seeds, and if necesssary additional duty on rice, than extra four annas on salt."

Thu number of undergraduates in residence this term at Cambridge Universisty is 665 as against 1227 during the corresponding term last year and about 3600 in a normal term. Amongst the 11,000 members of the University in the land, sea, and air services 1,723 casualties have been notified ; 697 have been killed and 892 wounded. The Victoria Cross has been awarded to three Cambridge men, the D. S. O. to 52, and the Military Cross to 103 ; the services of 714 members of the University have been recognised.

CORRESPONDENCE.

To the Editor of the *Planters' Chronicle.*

Sir,—In recent years potash has been largely employed as a manure by planters, especially for coffee; and sulphate of potash, muriate of potash, and kainit are the forms in which this manure has been chiefly used. As the great German Kali Works of Stassfurt had a practical, if not an absolute, monopoly of these salts, supplies have ceased, and various Manure Works now quote a prohibitive price for the small stocks they have in hand. The planter has, therefore, to look elsewhere for a substitute, but all the sources of potash at his command are unsatisfactory. I will not occupy your space by taking these in detail: it will suffice to point out that the only indigenous chemical substitute available, nitrate of potash, contains only 35% actual potash (K_2O) against 50% in the sulphate and muriate.

In view of the scarcity, I would like to point out that possibly it is within the power of Government to come to the aid of the planter. At the Aruvenkadu Cordite Works they use nitrate of soda for the production of nitric acid, whereas, if nitrate of potash were used instead, sulphate of potash would be a by-product, available to the planter as manure. Owing to the larger nitrogen content in commercial nitrate of soda as compared with commercial nitrate of potash, (about 16% against 10%, doubtless the former comes cheaper to the Cordite Factory in the long run. But it is possible that, if potassium nitrate were substituted, the income derived from the sale of the sulphate would counterbalance—perhaps more than counterbalance—the extra cost.

There are of course several factors to be considered before this change could be made, and on these I am not competent to offer an opinion. First, nothing could be allowed to interfere for a moment with the output of cordite, and if the substitution of nitrate of potash for nitrate of soda would involve any delay or break in the work, or even any considerable alteration in the machinery, that would at once put nitrate of potash out of court. But I think the substitution could be made without interfering in any degree with the work of the Factory. Next, when economy is so urgently called for in every sphere of both public and private work, there must be no rise in the working costs. This is a point the Cordite Factory authorities could easily determine. They would know just how much saltpetre would be needed to maintain the output at the required level, and what the cost would be; and they would know just how much potassium sulphate they would turn out, and what the market value would be. They can balance the figures against the present cost, working with nitrate of soda. Then again, there should be no uncertainty as to the supply. As the manufacture of saltpetre is under Government supervision, accurate statistics must be available showing the quantity of saltpetre now manufactured in Bengal, and in the Madras Districts, such as Trichinopoly and Coimbatore, where deposits of nitrous earth occur; and from these it can be seen whether saltpetre in sufficient quantity would be available. There can be no question that India could turn out all that would be required; and the demand would create the supply, if enough is not made under present conditions. Incidentally, this would be a boon to both crude manufacturers and refiners, and would be 'swadeshi' of the right kind.

I have said enough to show that my object in writing is merely to throw out the suggestion, in the hope that the Cordite Factory authorities will work it out, and see whether it is practicable. If, without detriment to their cordite manufacture and without loss to themselves, they can substitute nitrate of potash for nitrate of soda, and thus put a reasonable quantity of sulphate of potash on the market as manure, they will confer a real boon on the planting industry.

F. W. F. F.

The Planters' Chronicle.

RECOGNISED AS THE OFFICIAL ORGAN OF THE U. P. A. S. I., INCORPORATED.

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THE U. P. A. S. I.

(INCORPORATED.)

Contents.

The Deputy Director of Agriculture, Planting Districts, publishes a very interesting article beginning with the Thinning out of Rubber, and with the permission of the Managing Director of the Kerala Estate, a full report of the manurial experiments with the Hevea Rubber. We welcome this report as the forerunner, we hope, of many others. Now that the U. P. A. has become a Branch of the R. G. A. the more experiments and results that are published, the greater the interest that will be roused amongst all Rubber Planters.

We publish the Minutes of an Extraordinary General Meeting of the Anamalai Planters' Association and the Minutes of a General Meeting of the North Coorg Planters' Association.

A short review of the report on the Administration of Coorg 1914-15 is supplied by R. D. A.

The imports of Raw and Prepared Coffee by H. M. Acting Trade Commissioner in South Africa may be of interest to Coffee Planters.

We draw attention to the Notice ot the Labour Department, referring to the Easter Holidays.

SOUTH INDIAN PLANTERS' WAR FUND.

	Rs.	A.	P.
Amount previously subscribed	37,831	11	0
Mr. A. H. Robb	30	0	0
,, D. V. Crowe	7	8	0
,, R. Lescher	25	0	0
,, H. H. Byfield	50	0	0
,, G. E. Bewley	10	0	0
,, F. M. Hamilton	40	0	0
,, H. Clifton Leslie	10	0	0
Total ...	38,004	3	0

OVERSEAS AIR CRAFT FUND.

	Rs.	A.	P.
Balance	80	0	0

SCIENTIFIC DEPARTMENT, U. P. A. S. I.

Thinning out of Rubber.

I would call attention to the admirably sound remarks made by Mr. Arden in an article on '*the War and its Relation to Rubber Planting*' reproduced from the *India Rubber Journal* in the last issue of the *Chronicle*. Personally I would advise that, in Southern India at any rate, where the trees as a rule were planted far too closely thinning out operations should begin before the eighth year of their age. I think that these operations should begin in the third year. It is then possible to see which trees have grown poorly; some will have been cut down low for pink disease, some will have branched at a bad height, some will be wind damaged, or damaged by wild animals, some will be thin and whippy. All these might be removed at once, and each year afterwards similar bad trees could be removed. Finally when tapping is begun the question of selection by yield comes into force as Mr. Arden says.

If this system is adopted weeding will have to be done over a longer period no doubt and this emphasises the need for the intelligent use of a green dressing which will keep down weeds and supply organic matter, which over and over again is needed in our South Indian Rubber soils to improve the mechanical condition and supply the Nitrogen necessary to the growth of their trees in their younger stages.

Manurial Experiments with Hevea Rubber.

The Managing Director of Kerala Estate has most kindly given us permission to publish the following report on the manurial experiments which have been carried out on that Estate during the last two years.

Manurial Experiments were begun in July 1914 and have been conducted throughout the period from July 1914 to December 1915, the trees being tapped each month with the exception of March 1915; in February and April 1915 only 11 tappings were possible.

Each plot consists of 224 trees planted in 1907, 18 x 18. The tapping system adopted is half spiral, two cuts, daily tapping. The Experiments are as follows:—

Plot.	Manure.	Applied
I.	Sulphate of Potash. 1 lb. per tree.	
II.	Muriate of Potash. 1 lb. per tree.	
III.	Kainit. 4 lbs. per tree.	
IV.	3 parts of Basic Slag and 1 part Sulphate of Potash. 4 lbs. per tree.	25—30 June.
V.	3 parts of Basic Slag and 1 part Muriate of Potash. 4 lbs. per tree.	May 1915.
VI.	1 part of Basic Slag and 1 part Kainit. 8 lbs. per tree.	
VII.	5 parts of Basic Slag, 3 parts of Sulphate of Potash, and 4 parts of Nitrolim. 4 lbs. per tree.	
VIII.	Control. No manure.	

These Manurial rates are designed so that each plot receives as nearly as possible the same amount per tree of actual Potash and and Phosphoric Acid, or both, but in different forms and combinations. The soil is a poorish one, light red in colour, mixed with laterite rubble. The manures were applied round the trees at a distance of three feet from the stem, and forked in.

Table I shows the monthly rainfall for the period of the Experiment. The daily rainfall was carefully recorded and can be referred to by anyone interested, but it would take up too much of our space to reproduce it in full.

In considering the rainfall from an agricultural point of view it is necessary to take into account the number of days on which rain fell in any one month. For instance suppose that in one month there are 10 inches of rain which fell on 3 days, while in another month there are 10 inches which fell over a period of ten days, obviously the second is a better month agriculturally than the first, but the monthly rainfall returns do not show that. In the table below a factor has been introduced to allow for the daily distribution of the rain, the formula of which is Rt'/t, where R is the total rainfall for the month, t' the number of days in the month on which rain fell, and t' the number of days in the month. In the example given above the total rainfall for the month is in each case 10 inches, but if this formula is used the result for the first month is (10 x 3/30) 1, and for the second month (10 x 10/30) 3·3' which accentuates the difference and shows at a glance that the second month was the better one agriculturally.

TABLE. I.

Monthly Rainfall.

			Total Rain.	No. of days on which fell.	Rt'/t.
1914.	July	...	42·44	30	41·07
	August	...	10·10	18	5·86
	September	...	19·85	22	14·56
	October	...	10·75	22	7·63
	November	...	6·14	13	2·66
	December	...	3·35	8	0·86
1915.	January	...	2·20	2	0·14
	February	...	0·65	2	0·04
	March	...	2·71	9	0·78
	April	...	6·48	12	2·59
	May	...	10·41	12	4·03
	June	...	28·68	25	23,90
	July	...	40·80	26	34,22
	August	...	18·89	24	14·69
	September	...	20·29	27	20·06
	Oetober	...	20·70	15	10·01
	November	...	13·29	18	7·98

The results obtained from the plots are given in Table II. The results have been divided in the first place into two periods, the first from July to December 1914, and the second from January to December 1915, and then totalled.

TABLE II.

Results obtained from Plots.

Plots.	I		II		III		IV	
Manures.	Sulphate Potash.		Muriate Potash.		Kainit.		Sulphate Potash and Basic Slag.	
Year.	1914	1915	1914	1915	1914	1915	1914	1915
Number of times tapped...	214	247	214	247	213	247	213	247
Wet Rubber ...	265·82	639·71	279·76	593·80	314·33	574·06	316·76	667·55
Scrap ...	66·97	80·92	59·90	88·84	57·49	93·78	61·18	85·36
Total Dry Rubber ...	228·89	494·88	232·60	470·38	254·94	522·47	258·82	516·98
Difference from Control ...	— 14·34	+ 11·75	— 10·63	— 12·75	+ 11·71	+ 39·24	+ 15·59	+ 33·85
Order of Merit of Plots ...	7	4	6	5	4	2	2	3
Difference from control in 2 years ...	—2·59		—23·38		+51·05		+49·44	
Final order of Merit ...	4		7		2		3	
Cost of Manure and Application ...	51 8 0		47 8 0		92 8 0		116 8 0	
Value of excess Rubber at 2*s.* per lb. ...	...		...		76 8 0		74 4 0	

TABLE II.—RESULTS OBTAINED FROM PLOTS.

Plots.	V		VI		VII		VIII	
Manures.	Muriate Potash and Basic Slag.		Kainit and Basic Slag.		Sulphate Potash, Basic Slag and Nitrogen.		No Manure.	
Year.	1914	1915	1914	1915	1914	1915	1914	1915
Number of times tapped...	214	247	212	247	215	247	214	246
Wet Rubber ...	333·08	684·61	302·51	581·25	318·86	576·99	283·66	610·92
Scrap ...	62·62	81·32	61·65	98·15	60·72	100·23	73·56	93·26
Total Dry Rubber ...	269·44	525·96	249·53	463·00	258·19	465·32	243·23	483·13
Difference from Control ...	+ 26·21	+ 42·83	+ 6·30	— 20·13	+ 14·96	— 17·81	...	...
Order of Merit of Plots ...	1	1	5	7	3	6	...	...
Difference from Control in 2 years ...	+69·04		—13·83		—2·85		...	
Final Order of Merit ...	1		6		5		...	
Cost of Manure and Application ...	108 8 0		176 8 0		148 8 0		6 0 0	
Value of excess Rubber at 2s. per lb. ...	103 8 0		...		...		...	

(To be Continued.)

RUDOLPH D. ANSTEAD,
Deputy Director of Agriculture, Planting Districts.

DISTRICT PLANTERS' ASSOCIATIONS.

The Anamalai Planters' Association.

Minutes of an Extraordinary General Meeting held at 10-30 a.m., on 28th February, 1916, at the Club.

PRESENT.—Messrs. Congreve, Marsh, Moxon. Scott, Robb, Pittock, House, Lloyd, J. C. K. Walsh, H. O. D. Walsh, Carless, Behr, Cooper, Robinson, Fowke, Jeffrey, Dobbie, Jones, Cotton.

Before opening the meeting the Chairman said :—

Gentlemen, as you all know, Mr. Day the Deputy Director of the Labour Department, died last week. The loss to the Department of so able an Officer and to us of a friend whom we had all learned to love and respect is irreparable and I feel sure you will all join me in expressing our deep sympathy to Mrs. Day and to the Director of the Labour Department.

The Chairman proposed that the Honorary Secretary be asked to express to Mrs. Day and Mr. Martin the sympathy of the Association. Passed unanimously, all members standing.

1. The minutes of the last meeting were taken as read.
2. The Chairman then read his report as follows :—

Gentlemen,

It is now one year since I last had the honour of addressing you, and during that time the War has continued without abatement.

We, Planters, have suffered considerably through the heavy cost of freight, and difficulty and expense in obtaining estate requisites. In the case of Tea and Rubber, prices have been good and have to some degree compensated for increased costs, but with Coffee and Cardamoms this has been far from the case and it has been extremely difficult to dispose of these products at even moderate prices.

Western Outlet.—During the past 12 months considerable progress has been made in the forwarding of this scheme, and I understand from the Dewan of Cochin that the actual survey is now being done, and hope it will not be long before this is completed and the Tramway is started. The question of guarantees is before you today.

Medical.—As you are all aware the present situation is most unsatisfactory and for the past two months or more there has been no Government Medical Officer of any kind in the District. There is a suggestion before you today, to increase our present grant and to ask Government to do the same and to install a first class Assistant Surgeon instead of a fourth grade of Sub-Assistant Surgeons, such as we have lately had.

Township.—The Collector, Superintending Engineer, Executive Engineer and District Forest Officer have lately visited this District and in consultation with our Committee, have more or less laid out the future township. I fear however, that with the war on, there is little chance of much being done, but hope the Government will see their way anyhow to make the very necessary cart road through the township, connecting up the Monica and Castlecroft Roads as this is most urgently needed.

Roads.—I think there can be no question that the present condition of the Anamalai Ghaut Road is disgraceful. The surface of the Road is pitted with holes and a lot of the bridges are dangerous through the planking being rotten, and unless some steps are taken immediately it seems probable the

road will shortly be impossible for any wheeled vehicles. Although the traffic on this road has increased at the rate of over 12% per annum for the past 5 or 6 years, Government have given no larger grants than they did then and it is, in my opinion necessary for us to insist that better steps are taken to ensure our only means of ingress and egress to the district being kept in proper repair.

Labour Department.—We have now had the advantages of this Department for a full year and I am certain you will agree that it has been of very considerable service to us and has gone a long way to help us in our labour troubles. As time goes on and the Department gets more organised and is able to have more experienced agents in the villages, the benefits we shall receive will, I think prove the wisdom of our subscribing to this most necessary department.

Our Club has been built and opened during the past year, and I am sure will prove of great benefit to us all.

I have to thank the Honorary Secretary and Committee for their unfailing support through the year and now beg to place my resignation in your hands.

3. Honorary Secretary's Report.

Mr. Chairman and Gentlemen,—So far as I know there is no particular item of interest for me to report.

During the past year there have been three General and three Committee meetings.

The work of Honorary Secretary has been possibly rather more discouraging and difficult than usual, as I had to collect 2 years subscriptions all round and in some cases 3 years. I had hoped to leave my successor a clean balance sheet, but have been disappointed in this. Some subscriptions have come in since I closed the accounts and the amounts still outstanding are not large and mostly Planters' Benevolent Fund and War Fund Subscriptions.

Thanks to my predecessor I have had to collect Rs. 9,200 in subscriptions, or over double the usual annual income of the Association. I will take this opportunity of thanking members for the promptness with which they have responded to my bills.

I had hoped that in the coming year we might be able to reduce our present basis of subscription of 5 annas per acre, but this will I fear be impossible for another year at least.

Perhaps some member will be so good as to audit the accounts which you will see had an opening balance of 1-0-6 and close with a credit of Rs. 177-8-6, excluding the advance to Minor Forest Produce of Rs. 1,138-14-5. The acreage now subscribing to the Association is 12,425¼ acres, the average yearly increase now being 15%. The number of members of the A. P. Association is 22.

I would suggest to the meeting that the Planters' War Fund has not met with the support it deserves from this Association. The subscriptions from members through the Association total Rs. 1,800 which sounds a very creditable amount until on going into figures you find that nearly half the members have subscribed nothing. Every one can subscribe something, however small an amount, and I hope that those who have not already subscribed will do so to-day.

I shall be glad to answer any questions that I can about the accounts and now tender my resignation.

Mr. Robinson proposed and Mr. Marsh seconded that the Honorary Secretary's report be adopted. Mr. Robinson went on to say that he thought the only unsatisfactory item in the report was the number of subscribers to the War Fund, but he felt sure that it was only owing to slackness that it was not bigger, and that it would shortly be very considerably augmented.

Messrs. Robb and Behr were asked to audit the accounts.

4. *Support to the Club.*—Proposed by Mr. Congreve, seconded by Mr. Marsh that the Association shall pay a monthly sum of Rs. 10 per month for the first year and a monthly subscription of Rs. 5 for subsequent years subject to a notice of six months on each side and that the Association have the absolute right to hold all meetings in such rooms as shall be allotted for the purpose by the Club Committee dating from the first meeting of the Club.

5. *Post Act.*—Papers read and recorded.

6. *Tea Seed.*—Rail freight. Resolved that this matter be left to U. P. A. S. I. to deal with.

7. *Branch Roads.*—Proposed by Mr. Behr seconded by Mr. Robinson "that all branch roads in the District should be treated alike as regards grants."

Ghaut Road.—Resolved that the Association address the Government through the Planting Member about the disgraceful condition of the Ghaut road.

8. *Western Outlet.*—Read the Cochin Dewan's letter of 3rd February 1916. The Honorary Secretary was requested to ask the Dewan if the Association was right in presuming the rates quoted to be Rail Risk rates, as questions of damage must in the opinion of the Association be settled between the Durbar and the Cochin-Shoranur Railway.

Resolved that the Honorary Secretary be asked to thank the Dewan for the way in which he has met the views of the Association in the matter of the Western outlet.

9. *Township.*—Mr. Robb representing the Township Committee gave the meeting an idea of the present position with regard to building sites &c. Mr. Marsh proposed and Mr. Scott seconded a hearty vote of thanks to the Committee for their services.—Passed unanimously.

10. *Medical.*—Proposed by Mr. Marsh seconded by Mr. Robb that the Association agree to increase its contribution to the Local Fund Hospital if the District Board will agree to increase their contribution in the same proportion.

11$\frac{7}{8}$ *Post Office.*—Progress of the telegraph line was noted with satisfaction. The Honorary Secretary was requested to send a reminder to the Postmaster General about the expediting of the Postal Service and to request that when the New Post and Telegraph Office is opened the present Post Master may be confirmed in his present Post.

12$\frac{7}{8}$ *Magistrate.*—The Honorary Secretary was asked to address the Collector of Coimbatore requesting that the Local Sub Magistrate be empowered to try all contested cases in the District instead of in Pollachi.

13$\frac{7}{8}$. *Association Rules.*—(1) Proposed from the Chair and seconded by Mr. Marsh that the Official year of the Association shall be from January 1st to December 31st, subscriptions being due from January 1st of each year.

Passed with one dissentient.

(2) Proposed from the chair seconded by Mr. Robb that rule 17 be altered to read "representing not less than half of the total number of votes."—Passed.

14. *Labour Rules.*—(1) Proposed by Mr. Behr seconded by Mr. Robinson that the District advance be Rs. 10 per head inclusive of everything for coolies from Coimbatore, and Salem Districts and Karur and Musiri Taluqs, and that all cumblies shall be charged to coolies accounts and value deducted from their wages.—Passed.

(2) That for Free coolies the limit of weekly advances shall be Rs. 2 per Maistry, I-8 per man and 1/ per woman and at the end of each month a maximum of 75% of the pay due to them can be given.—Passed.

(3) Proposed by Mr. Scott and seconded by Mr. Robinson that each estate subscribing to the Association shall render to the Honorary Secretary a list of the rates paid by them for contract works and that copies of such lists be forwarded to all members of the Association and be revised every six months. Passed with one dissentent.

(4) That copies of all old and New A. P. Association and Labour rules be circulated among members by post registered for acknowledgment.

(5) That the Honorary Secretary ask Mr. Robb for details of an additional clause in his labour agreements.

15. *Minor Forest Produce.*—Proposed by Mr. Robinson seconded by Mr Marsh that a Sub Committee composed of Messrs. Scott and Dobbie be asked to go into the accounts and submit a report at the next A. P. A. meeting and that on completion of their audit a general meeting be called to elect New Office bearers.

16. *Election of new Members.*—

Mr. D. Walsh Proposed by Mr. House Seconded by Mr. Cotton.
" S. Sladden " " Robinson " " Robb

17. *New Office Bearers.*—Chairman Mr. Robinson.
Vice-Chairman Mr. Behr.
Honorary Secretary Mr. A. A. Robb.

With a vote of thanks to the chair the meeting closed.

North Coorg Planters' Association.

Minutes of General Meeting held in Mercara at the North Coorg Club, on Monday, 6th March, 1916.

PRESENT.—Messrs. W. M. Ball. President (in the Chair), E. L. Mahon, H. W. Sheldrick, F. Macrae, A. J. Wright, A. F. Magniac, F. H. Sprott, G. K. Martin, W. R. Wright, T. Hext, F. Hannyngton, Commissioner of Coorg, G. R. Pearse, P. G. Tipping, Honorary Secretary.

1. Read notice convening the Meeting.

2. Minutes of last General Meeting were then read and confirmed.

3. *Pest Act.* Resolved that the Associations that are interested in this Act, have the sympathy and support of the Coorg Planters' Association.

4. *Lantana on Cultivatable Lands.*—It was proposed by Mr. Mahon and seconded by Mr. Macrae, that in view of the renovating effect lantana has on cultivatable lands, that the Local Government be asked to favourably consider the exemption of such lands from the existing Tax, until such time as they can be redeemed and brought under cultivation again.—Carried.

5. *Finances.*—Proposed by Mr. Mahon and seconded by Mr. Martin. That the resolution of the Committee with regard to the discontinuance of our subscription to L. A. N. I. be confirmed, until some future date when our Finances permit of rejoining.—Carried.

6. Proposed by Mr. Martin and seconded by Mr. Mahon, that the recommendation of the Committee to meet U. P. A. S. I. two anna calls in the near future out of reserve funds and suspend further calls on Members of the Association for the present be confirmed.—Carried.

7. *Bail of Warrantees.*—Proposed by Mr. Macrae and seconded by Mr. W. R. Wright, that this Association do approach the District Magistrate in connection with the amount of bail, as at present, fixed for Maistries and coolies apprehended on breach of contract warrants which it considers should in justice to the complainant, be considerably increased.—Carried.

8. Resolved, that this Association views with apprehension the general deterioration of the roads and desires to bring this to the notice of the Chief Commissioner through the Executive Engineer.

9. That the attention of the District Board be again called to the urgent need of completing the causeway across the Chicklehole on the Sidapur Suntikoppa road.—Carried.

10. *Post Offices.*—Proposed by Mr. Pearse and seconded by Mr. Magniac that the Honorary Secretary do draw the attention of the Superintendent of Post Offices, to the fact that the time of despatch and delivery of mails at the Somwarpet office is now less convenient to the planters interested, than it used to be and hopes that he will see his way to remedy this.

11. *S. I. P. Aircraft Fund.*—With reference to Committee's resolution Read letter from U. P. A. S. I. showing that subscriptions received to date had already been paid into the O. S. Aircraft Fund.—Approved.

12. *Cumblies.*—The Honorary Secretary intimated that nothing further had been done in this matter through lack of support.

13. Conditions under which Labour is employed on Estates.

The decisions of the various associations, in this matter was approved.

A vote of thanks to the Chair and Honorary Secretary terminated the Meeting.

(Signed) W. M. BALL,
President.

(„) B. G. TIPPING,
Honorary Secretary.

REPORT ON THE ADMINISTRATION OF COORG.

1914-1915.

In this Report which has just come to hand it is stated that the total rainfall recorded at Mercara amounted to 129·82 inches which was 4·57 inches in excess of the average. The South West Monsoon was succeeded by damp cold weather with rain at intervals throughout the dry season which had an adverse effect on the Coffee crop.

The new Tea garden opened out near Hudikeri is coming on well but the situation and altitude appear to demand the necessity for artificial shade to protect the young bushes. Hevea Rubber at Makut and Sampaji continue to show promising rate of growth but the tapping stage has not yet been reached. Great success has been obtained at the Sidapur Experimental Farm in the growth of Oranges, Potatoes, Maize, and Mulberries.

With regard to Lantana work it is stated that " as was anticipated " last year it has been found that regrowths have to a great extent " " overtaken original clearance work, much of which has now to be done " " over again. No doubt much of the original clearance carried out five " " or six years ago was carelessly done and it is probable that even with " " the help of the New Regulation, it will not be possible to do more than " " prevent the further spread of the weed."

" The year was fortunately unmarked by any serious visitation of " " insect pests. An Agricultural Supervisor was placed on special duty " " for six months to investigate the ravages of Green Bug in Native Coffee " " estates. He advised owners as to the best means of fighting " " the pest but found many of them very apathetic. Luckily the heavy " " monsoon brought a good growth of the fungus which is the surest enemy " " of the Green Bug in the damp climate of Coorg. The Imperial " " Mycologist, Mr. Bainbrigge Fletcher, visited Coorg in April and May " " 1914 and made several interesting discoveries. It appears that Ants " " are the chief means of spreading the pest and planters who have syste- " " matically destroyed the ants' nests on their estates report excellent " " results. Towards the close of the year the Borer beetle began to appear " " in abnormal profusion on many estates. As practically nothing is " " known of its life history it will probably be found necessary to obtain " " expert advice in order to deal with it more effectively."

The following figures extracted from the Report are of interest to planters :—

Total area of Coorg	1,012,260	acres.
Forests	357,740	,,
Not available for cultivation ...	334,225	,,
Cropped area	138,691	,,
Area under Coffee	42,495	,,
Area under Tea	100	,,
Area under Rubber	3,367	,,
Area under Cardamoms	2,344	,,
Export of Coffee 1914-15... ...	2,100	tons.

R. D. A.

COFFEE.

South Africa.

IMPORTS OF RAW AND PREPARED COFFEE.

H. M. Acting Trade Commissioner in South Africa (Mr. H. E. Gauntlett) has furnished the following statistics showing the total value of imports of coffee into South Africa during the last three years for which statistics are available, and the respective shares in the trade of the principal exporting countries:—

IMPORTS OF RAW COFFEE.

—	Brazil.	Netherlands East Indies.	Costa Rica.	Germany.	Total from all Countries.
	£.	£.	£.	£.	£.
1912 ...	721,516	20,644	19,820	17,653	785,990
1913 ...	622,520	31,552	18,544	7,894	686,425
1914 ...	476,563	20,400	17,788	2,014	521,464

IMPORTS OF ROASTED, GROUND OR MIXED COFFEE.

	Nether-lands.	United Kingdom	Germany	United States.	Total from all Countries.
	£.	£.	£.	£.	£.
1912 ...	16,335	2,480	691	341	21,263
1913 ...	16,039	2,472	369	200	20,412
1914 ...	12,004	2,374	180	386	16,194

As regards imports of raw coffee from countries other than these mentioned above, imports from Turkey and India are the most important; imports from the United Kingdom are negligible.

H. M. Acting Trade Commissioner points out that the above figures show that there is a large trade to be done in raw coffee in South Africa by any British firm that can compete by supplying the class of produce to which this market is accustomed. Success in efforts to obtain a footing in the market almost entirely depends upon price, coupled with ability to execute orders with freedom and to ensure that the produce delivered is up to sample.—*The Board of Trade Journal.*

LABOUR DEPARTMENT.

Subscribers to the Department are informed that Saturday the 22nd, Sunday the 23rd, and Monday the 24th of April will be holidays in the offices of the Labour Department. It is requested that letters which are likely to arrive in the various offices on those days may be held over till these Easter Holidays are over.

AYLMER FF. MARTIN,
Director.

Coimbatore, 14th March, 1916.

The Planters' Chronicle.

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(INCORPORATED.)

Contents.

The Scientific Department publishes the continuation of the interesting report on manurial experiments with Hevea Rubber. Table III giving the difference in yield of dry rubber each month between each plot and the unmanured plot will be followed with interest by all planters.

The Director of the Labour Department, under instructions from the Control Committee, sends for publication extracts from his report for the first seven months of the second year's work, and shows distinct progress; reading the "personal" para and the two first paras on page 150, we cannot but all of us deeply sympathise with the Director in his loss of such able assistants. In this connection, we have great pleasure in publishing the fact that the acreage subscribing to the Department amounts to 100,665·97 of which only 7348·50 do not subscribe to District Associations.

The Manager, National Bank of India Ltd., Madras, has sent us a letter which we have much pleasure in publishing.

Under "Rubber" we publish the Rubber Statistics by the Rubber Trade Association of London.

Under the heading of "Correspondence," we publish two letters on Lime. We hope that Dr. Smeeth's communication will receive the attention it deserves: and that not only District Associations, but individuals, will by informing the Secretary, U. P. A. of their requirements, furnish Dr. Smeeth with that rough estimate that would satisfy him that the introduction of the necessary plant, would be justified.

A cookery book by Mrs. Vieyra has been sent to us entitled Culinary Art Sparklets which appears eminently suitable for the upcountry household. One addition we would recommend is that a Tamil equivalent should be given to accompany the Hindustani equivalent. So many useful hints are given that no "careful housewife" should be without a copy and a good cause will be furthered if every reader purchased a copy, as 20 per cent. of the proceeds are being given to the Madras War Fund. We recommend it too to the lonely bachelor.

SCIENTIFIC DEPARTMENT, U. P. A. S. I.

Manurial Experiments with Hevea Rubber.

(Continued).

One thing is at once apparent and that is that Plot V turns out to be the best in both periods, while the order of merit of the first four plots in the 1914 period is V.IV.VII.III, and in the 1915 period is V.III.IV.I. If the whole period of the experiment is considered the order of merit is V.III.IV.I, agreeing with the 1915 period. It is most important and satisfactory to find that the same Plot is the best throughout the whole period of experiment, and it may be taken that this goes far to prove that the right combination of Potash and Phosphoric Acid on this particular soil is Muriate and Basic Slag.

Plots III and IV give very similar results. The results as a whole are admittedly puzzling. If a combination of Muriate of Potash and Basic Slag gives the best result one would have expected Muriate of Potash by itself to also give a good result, but this is not the case, this being the worst of all. One would argue from the results that a combination of Potash and Phosphoric Acid is better than Potash alone and that it is unnecessary to apply Nitrogen (if yield of rubber alone is considered) since Potash, Slag, and Nitrolim give a worse result than Potash and Slag. Also if Potash alone is supplied it does not much matter whether it is in the form of Kainit or Sulphate, but that if Potash is to be combined with the Slag the best form of Potash to use is Muriate.

I am not prepared to offer any explanation of these results, but think that we can only at present accept them as they stand.

Another result which the experiments prove is that manuring in the right way does produce an increased yield, a point which has been rather doubted in Southern India. Whether such manuring pays or not is quite a seperate question and it will be dealt with later in this report.

The actual increase in yield of the manured Plots is more strikingly shown if the difference in yield between each plot and the Control unmanured Plot is calculated for each month in the period. This has been done in Table III.

In this Table several remarkable points are at once apparent. First both in the 1914 and 1915 period during the months of August and September all the plots give a less yield than the Control so that the manures are then apparently ineffective. In October the manurial Plots gradually gain on the Control while in November all the Plots give more rubber than the Control. The rainfall in the two years did not differ very much. It is not easy to interpret the exact meaning of this phenomenon. The manures are applied in May and June and appear to be at once active since in June most of the Plots give a bigger yield than the Control and in July all but one do so. Plot V gives its biggest increase over Control immediately following the application of the manure. It would almost appear that two applications of manure are indicated, one say in April with the early rains and another in September as soon as the heavy monsoon is over.

TABLE III.

Difference in Yield of Dry Rubber each month between each Plot and the Unmanured Plot.

Plots.	I.	II.	III.	IV.	V.	VI.	VII.
1914—							
July ...	—2·42	—3·36	+4·85	+2·78	+5·90	+1·81	+1·60
August ...	—6·93	—3·08	—6·85	+0·82	+3·29	—1·67	—4·00
September ...	+10·26	—4·09	—6·89	—7·62	—1·68	—4·54	—5·57
October ...	—2·18	—2·86	+3·55	+4·59	+4·22	—0·10	+2·27
November ...	—1·95	—2·92	+8·26	+9·67	+11·00	+6·37	+9·87
December ...	+9·39	+4·63	+8·79	+5·35	+3·48	+4·63	+2·08
1915—							
January ...	—4·90	—0·87	+11·03	+4·82	+2·06	+3·39	+2·08
February ...	—0·57	+0·93	+1·62	+2·44	+1·18	+1·00	+0·78
March ...	...	...	...	...	...	...	...
April ...	—0·47	—1·72	+0·53	+1·07	0·00	+0·04	—0·47
May ...	+2·21	—5·58	+8·05	+14·58	+19·98	—4·70	+1·76
June ...	—0·54	+0·79	+2·06	—1·05	+11·36	—3·74	+5·65
July ...	—0·58	+2·63	+11·25	+6·03	+10·59	+2·29	+1·84
August ...	—7·65	—3·65	—6·09	—2·54	—4·06	—10·42	—9·60
September ...	—3·00	—8·55	—0·86	—2·46	—1·19	—1·43	—2·22
October ...	+5·13	—2·37	+3·44	0·00	—6·00	—8·08	—4·69
November ...	+8·33	+3·52	+5·36	+8·63	+10·75	+6·32	+0·51
December ...	+3·99	+2·02	+0·95	+2·24	—4·22	—0·08	—13·45

When we come to consider the cost of the manures applied and to set this against the price of the increased yield of rubber (See the last two columns of Table II) the results are distinctly disappointing. In fact at the first glance the results of our experiments seem to prove that it does not pay to manure. This, however, I venture to think is a false conclusion for the following reasons:—

(*a*) The increased health and vigour and also the girth of the trees must be taken into account as well as the actual increase of rubber obtained. In this connection I would refer to what I wrote on the subject in a recent Report on a tour in Malabar (*Planters' Chronicle* X, p. 634).

Unfortunately we did not measure the girth of the trees on the Experiment Plots at the time the Experiments were begun, but this is going to be done in the future.

A Census made in January 1916 showed that the trees in Plot V had an average girth at three feet from the ground of 28 inches while the trees in all the other plots averaged from 26 to 25 inches. If the trees were all about the same girth when the Plots were chosen in 1914 this would point to the fact of increase of girth in the best Plot as well as increase of rubber. There is no data for supporting this assumption, it is only likely as a fairly even lot of trees were naturally chosen for the purposes of the experiment.

(b) No system of manuring can be judged on the results of only one or two years. I put the least period down as five years: I believe that at Rothamsted they prefer fifty.

The increase in this yield of Plot V, for instance over the Control was far more in 1915 than in 1914. If this increase continues in future years we shall find that at the end of five or ten years manuring does pay over the whole period. For instance suppose, as may be legitimately expected, that in 1916 we get, from Plot V another increase of 43 lbs of rubber over the Control, then at the end of the three year period we shall have got an extra 112 lbs of rubber from this Plot valued on the 2/ a lb. scale at Rs.168 while the expenditure on manures and their application over the three year period will only have amounted to Rs. 154-4-0 and the profit instead of loss will have begun.

Moreover it is possible, indeed probable, that the annual increase in yield per tree is greater over a period of years in the manured plots than in the unmanured. These points have not yet been proved because the experiments have not yet been running long enough.

(c) The general health of the trees must also be taken into account, their power of holding their foliage, responding to rain, immunity from diseases like the secondary leaf-fall, recovery from the attacks of disease, bark renewal power etc. Manured trees will probably show an advantage on these points over unmanured, in fact it is generally admitted that they do so even by those who are opposed to the manuring of Rubber as a paying proposition.

Interdependence of Manuring and Pruning of Tea.

During a recent tour Dr. Hope, the Scientific Officer of the Indian Tea Association delivered a lecture on the subject of the "interdependence of garden operations" during the course of which he said that a great many cases come before his notice in all districts of great thought and care being given to one or more particularly of the many garden and factory operations, and he wished to warn planters that it is most important that all operations should be advanced simultaneously because they are really interdependent, and if one operation be neglected or the intensity of that operation be less than that of others the result looked for will be held back by omitting to to carry that operation far enough. Thus for instance pruning and manuring are closely inter-dependent. Intensive pruning is without doubt a more severe check to bushes that a less advanced type of pruning, but if manuring be resorted to in order to promote the formation of new shoots to replace the old undesirable wood which has been removed in carrying out intensive pruning, the results,—a bush with a bigger, better, more vigorous frame of younger wood—in which pruning and manuring both play an important part will be achieved; and conversely a given expenditure on manures will not prove so profitable where inefficient pruning be done as where the frames of bushes are kept of the right size and shape and as free as possible from undesirable wood and unproductive shoots, by good pruning.

RUDOLPH D. ANSTEAD,

Deputy Director of Agriculture, Planting Districts.

LABOUR DEPARTMENT.

Labour Department of the U. P. A. S. I. Incorporated.

Under instructions from the Control Committee the following extracts from the report of the Director for the 1st seven months of the 2nd year of the Department's work are now published.

Work done.—The number of fresh instances in which the assistance of the Department was invoked by subscribers during the period under review was ... 2,361
and old cases pending on 30th June 1915 were ... 1,150
... 3,511

The number of such cases which for various reasons and after everything possible was tried, had to be dropped with the consent of the subscribers concerned was ... 54

Pendency.—The balance of cases pending, that is about which correspondence enquiry and action is still in progress numbers ... 2,176

Recoveries.—The amount of cash which was received through the Department and remitted to Subscribers was... Rs.14,645 15 5

The amount which was found to be irrecoverable by any known means was... ... ... Rs.10,255 8 10
and action is still being taken to try and recover ... Rs. 2,987 2 5

The total involved in these cases is ... Rs.27,888 10 8

The percentage of recovery to demand is therefore about 55%

Defaulters.—317 defaulters promised to return to the Estates of subscribers to work off their indebtedness amounting to Rs. 18,545-0-2 of these 196 actually arrived on the Estates and represented a sum Rs. 13,156-14-3. The percentage persuaded to keep their word was therefore about 65%.

Internal Competition.—The number of cases which the Department assisted to regulate was 13

Unfair Competition.—was dealt with in ... ... 20 cases.

External Competition.—Has given us no trouble. The former amicable relations with the Ceylon Labour Commissioner has continued, and has advanced in a definite manner. Where it was possible, spheres of influence have been laid down and an understanding arrived at with reference to giving employment to former servants of the Ceylon Labour Commission and of this Department, and with regard to advertising, all which are subject to your ratification. The Committee in Ceylon have ratified these arrangements. (the Control Committee of the Labour Department has since ratified these arrangements). I have not yet had time to interview the authorities in charge of recruiting for Malaya, and no special reason arose during the period under review to do so.

Information about Kanganies and Maistries was supplied to Subscribers to the number of 981

Laggards.—1283 were hurried up.

Assistance was applied for by 547 Maistries and Kanganies who were helped in all their difficulties.

Recruiting.—302 recruiting Maistries and Kanganies were actively assisted in their operations.

Ground was broken in the Ceded Districts, one Estate in Mysore has a gang which appears to be settled on it. Another Estate in Coorg was also supplied, but this was a case of "direct recruiting" and failed. It was undertaken against our avowed principles in response to the appeal of the Estate concerned which was warned beforehand of the difficulties.

Advice was given to 96 Estates about where and when to get coolies.

Warrants 61 Civil and 273 Criminal Warrants were served through the Department.

I find a number of cases still in which want of correct names and addresses and proper means of identification of the defaulters and technical flaws connected with Warrants hamper our work. The Department will see these things altered for the better and this in itself, will be a great point gained.

New connections.—1478 villages were searched for new connections, touch has been established with some districts which I hope will relieve the situation, and the time is fast approaching when this hope will become a certainty or be falsified. The seven months under report are not those when conditions for recruiting new coolies are as a rule favourable.

Advertising.—A Rubber film and Coffee film have now been prepared. The Tea and Rubber films were on show at the Madras Exhibition, but I have not pushed this form of advertising as the Coffee film is still a negative. The positive will soon be ready and the 3 will be shown together by touring companies in the Villages. General advertisement has been done both personally and by means of leaflets over all the area in which we are interested. The existence of the Department and its Agents who are so much on the move is of course an advertisement in itself.

Delivery of the embossed tin plates has been so long delayed owing to the war, and the price being enhanced very greatly, I have thought it best to give notice to the Manufacturers in England that if they can't deliver them by 30th June, I do not require them. I feel that so much expense is not justified unless the Department can have the benefit of the advertisement for at least 3 years of the time for which the present arrangements have been made.

Estates.—49 were visited with a view to helping on labour matters.

Professional Recruiters.—Measures were taken to discredit the operations of 6 professional recruiters. It is astonishing how few of these men now come to our notice. The fact that the Ceylon Labour Commission looks up these people in the same light as our Department does, and the efforts thus combined to discountenance them has had a great effect. I do not see how they can now make a living by this means unless it be in their work for Malaya. The facts remains that we are not troubled by them as we used to be.

Restriction of Advances.—This subject continues to engage my attention. No fixed agreement has been come to by Planters generally, and without this Subscribers to the Department cannot be expected to bind themselves to a fixed maximum rate of advance. All those who have

been approached have expressed their sympathy with the movement, and some have stated their willingness to come to a definite arrangement provided the movement is general over S. India. The urgency with which the subject has been pressed on the notice of the community at large has had an undoubted effect, and I expect during the coming season to see an improvement as the result of our efforts, which will be something gained, though we cannot be satisfied with this. The Department will continue to urge the necessity of a fixed arrangement.

Registration.—My finger print bureau has been in working order for some months, but subscribers have shown little inclination to make use of it. Two references both from the same Estate were made, and in each case the identity of the defaulter was satisfactorily dealt with to the advantage of the parties concerned. The completion of the Directory has been prevented by illness in my Office staff.

Special observation was exercised over 21 Maistries and 142 coolies at the request of subscribers.

Warnings.—7 Circulars containing the names of 42 men who should not be advanced have been issued with good results, and we have had no trouble with the men so listed. I continue to be confident that but for these warnings, numbers of these rascals would have victimized subscribers, and perhaps each of them more than once. The two Moplahs who were going about with a certificate on which Mr. C. E. Abbott's name was forged found their game was up, and they are now in jail.

Personal.—The Department has suffered very grievous loss by the untimely death of two valued Officers. The senior Superintendent Mr. Ward died at his post in Srivilliputtur on the 21st October last after a fortnight's illness, and the Deputy Director Mr. Day who was hard at work practically as long as he retained possession of his faculties, died at Coimbatore on the 1st February only the other day, after 5 days illness. The sudden cessation of the work of men of their character and great ability, and on whom so much depended are calamities with which it is hard to cope. At Srivilliputtur I was fortunately able to fill the gap myself for a month, and at the end of that time Mr. Clementson who had proved himself energetic and capable in his previous charge, was available to take Mr. Ward's place, and so the gap was bridged with no other damage than was unavoidable from the substitution of one man for another. But the Chingleput Divisional charge was left vacant till the 15th Feb. when I obtained the services of Mr. G. W. F. Walters. I was forced to add the work of that centre to my own and in consequence I had to neglect affairs more than I liked in Mysore and the Ceded Districts, which form my own particular charge. To what extent this was the case may be judged by the fact that three Agencies remained vacant and the work in them undone till I could attend to them in January and February, and that of the 12 Agents now directly under me, there are still two with whom I am unacquainted except by correspondence, while all inspection work had to be suspended for sometime.

In the ceded districts where I had hoped to advance matters by personal visits, all that could be done was to mark time. I attribute the absence of complaints from Subscribers to their forbearance and to the loyalty of my staff who rose to the occasion with good will.

Mr. Day carried on the work in his Division with his accustomed energy and zeal in spite of being hampered with sickness among his staff. It will be hard indeed to replace him. It is too early to say in this report what can be done to meet the situation.

Apart from the conspicuous fitness of the two Officers of whose services we have so sadly been deprived, for their respective positions and centres of employment, their personalities commanded respect from all who knew them. They put their whole strength into their work, and succumbed in the service of the Planting Community. They realized that the Department had a duty to all S. Indian Estates, and that in working for subscribers of the Department the interests of others were also involved. My own loss had been all the greater because they were my personal friends and served me with loyal devotion.

Our business in the Southern Division at Nagercoil was kept efficient and up to date by the good service and hard work of Mr. Prince, Mr. Bartels and Mr. Walton continued to give me satisfaction. Their task is an uphill one, and they will be put to severe tests within the next few months, for which their work in the past has been merely preliminary.

General.—The Department took part in the Madras Exhibition to an extent which was not anticipated.

AYLMER Ff. MARTIN,

Director.

National Bank of India, Limited.
Post Box No. 64,
Madras, 8th March 1916.

THE MANAGER,

The Planters' Chronicle.

Bangalore.

Dear Sir,—I have the pleasure to inform you that I have this day received advice by wire from my Head Office in London that the net profits of the Bank for the year ended 31st December last including the sum brought forward amount to £384,413.

The Directors propose to pay a dividend for the half year at the rate of 16% per annum, applying £76,273 to writing down investments including War Loan to current prices, place £25,000 to Reserve Fund, £10,000 to House Property account and £10,000 to Pension Fund, carrying forward £103,140.

I am, Dear Sir,
Yours faithfully,

(Signed) .....

Manager.

RUBBER.

Rubber Statistics.

The following statistics have been published by the Rubber Trade Association of London and issued in Messrs. W. H. Thompson's Monthly Rubber Statistical Circular for January 1916.

IMPORTS OF ALL KINDS OF RUBBER INTO THE UNITED KINGDOM.

From	January. 1916	1915	1914*
Straits Settlements & Federated Malay States ...	3,659	4,541	2,576
Ceylon ...	1,089	1,866	611
British India ...	236	216	—
Dutch East Indies ...	256	283	—
Brazil and Peru ...	926	306	1,264
Africa ...	332	419	24
Other Countries ...	100	95	1,523
Total Tons...	6,598	7,726	5,998

The Customs returns now give the Imports from Africa for December, 1915, as 427 tons and the total Import for the month as 5,411 tons. This will make the totals for the year 1915:—Africa, 3,794 tons, and Total 78,591 tons.

EXPORTS OF ALL KINDS OF RUBBER FROM THE UNITED KINGDOM.

To	January. 1916	1915	1914*
Russia ...	225	329	710
Germany ...	—	—	825
Belgium ...	—	—	294
France ...	687	307	591
United States ...	2,176	342	1,588
Other Countries ...	750	911	375
Total Tons...	3,838	1,889	4,384

*Including Waste and Reclaimed Rubber.

PLANTATION IMPORTS, DELIVERIES AND STOCKS IN LONDON.

Imports	Deliveries.	Stocks 31st January.		
For Jan.	For Jan.	1916	1915	1914
5,349	4,625	7,342	6,643	3,866 Tons.

SHIPMENTS FROM STRAITS SETTLEMENTS AND FEDERATED MALAY STATES.

	†December. 1915	1914	1913	Twelve Months ended December. 1915	1914	1913
Tons ...	8,116	5,695	3,835	79,415	50,424	35,354
From Ceylon ...	1,869	—	—	20,153	16,176	11,834

† Figures made up to December 31st.

PARA RECEIPTS.

	January. 1916	July-Dec. 1915	Total.
Rubber ...	3,200	14,070	17,270 tons
Caucho ...	550	2,240	2,790 ,,

	January. 1915	July-Dec. 1914	Total.
Rubber ...	3,070	12,743	15,813 ,,
Caucho ...	490	1,552	2,042 ,,

Messrs. Lewis and Peat's Rubber Report dated 23rd February 1916 is as follows:—

Plantation has been quiet throughout the early part of the week and prices have shown a fall of 2*d.* per lb. for near positions, closing steady with more enquiry and only a small amount of Rubber offering on the spot.

Prices ranging as follows:—

	Crepe.	*Smoked sheet.*
Spot ...	3/7 @ 3/5¼	3/6 @ 3/4
Arch ...	3/7½ @ 3/5½	3/6 @ 3/4½
April-June ...	3/7¼ @ 3/5½	3/6 @ 3/4½
July-December ...	3/5½ @ 3/4¼	3/5 @ 3/3¼

Closing rather buyers at the lower prices.

Hard Fine has been dull with only small enquiry and prices have dropped about 2*d.* for all positions, closing with sellers of near positions at 3/0½, May and June 3/0¾ and no buyers over 3*s.*

Ball is offering freely at 2/6*d.*

SOUTH INDIAN PLANTERS' WAR FUND.

	Rs.	A.	P.
Amount previously subscribed	38,004	3	0
Mr. E. Campbell-Walker	15	0	0
,, J. S. Wilkie	30	0	0
,, W. A. J. Milner	20	0	0
,, W. H. G. Leahy	28	0	0
,, H. R. Crowther	10	0	0
Honorary Secretary of the Quilon Club, being the Entrance fees of a small Tennis Tournament	35	0	0
Eddivanna Revolver Club	5	0	0
Total...	38,139	3	0

OVERSEAS AIR CRAFT FUND.

	Rs.	A.	P.
Balance	80	0	0

CORRESPONDENCE.

25, South Parade,
Bangalore, 14th March 1915.

Lime.

Dr. W. F. SMEETH, M.A., D.Sc., F.G.S.,
Director,
Department of Mines and Geology, Bangalore.

Sir,—I have the honor to inform you that Mr. L. E. Kirwan of Arbidicool Estate, Chickamaglur, writing to me to-day says, "and can you also let me know what probability there is in the near future of lime being made available for Planters by the Mysore Government. I understand that Mr. Smeeth is developing some scheme in this connection." I should feel very much obliged if you could and would give me any information on this subject, which is of very great interest to the planting community and industry. If you could give me any information for publication in the *Planters' Chronicle* I should be much obliged. I had heard that you were prepared to sell at Rs. 8 a ton. How far this is true I cannot say, but you might put me right. I need hardly say that at some such figure, it would be of immense value to all the Planting Districts of Southern India. I should say there would arise an enormous demand.

Trusting you will be able to furnish me with any information.

I have the honour to be,
Sir,
Your most obedient servant,
FLETCHER NORTON,
Secretary.

No. 2071. Bangalore, 15th March, 1916.

From
Dr. W. F. SMEETH, M. A., D. Sc., A. R. S. M., &c.,
Director, Department of Mines and Geology,
Mysore State.

To the SECRETARY,
United Planters' Association of Southern India,
25, South Parade, Bangalore.

Sir,—In reply to your letter of the 14th instant, about lime for agricultural purposes in Mysore, I may say that I see no reasonable prospects of lime being obtainable at Rs. 8 per ton. By "lime" I mean burnt lime and not raw limestone.

2. There are certain areas in the Tumkur District where limestones suitable for agricultural purposes have been located. The stone is very variable in character and would require careful selection. Part of it is ordinary calcium limestone, but the greater portion is magnesian limestone, or dolomite.

3. Experimental work which has been conducted in the United States and Canada appears to show that magnesian limestone is just as good as the calcium limestone or that the lime may be replaced by an equivalent weight of magnesia. No doubt there are limits to this statement, and much will depend on the relative proportions of lime and magnesia in the actual soil to be treated.

4. Another important point is that the raw limestone when crushed to a coarse powder may be used instead of burnt lime, and the decision as to which should be employed is largely determined by the cost per unit of

lime in the two materials. There is however much divergence of opinion on this point, and it is obviously a matter for careful preliminary experiment in Mysore.

5. With a view to obtaining further information some 20 tons of the limestone have been quarried, including both the calcium and magnesian varieties. Part of this has been crushed and part converted to burnt lime and several tons of each kind have been supplied to Dr. Coleman —Director of Agriculture—who has undertaken to make some large scale tests. It will take a year or two to obtain any trustworthy results and it would be premature to contemplate the erection of a plant until definite results have been obtained. The plant required for preparation of crushed limestone will obviously be very different from that required for burnt lime.

6. As regards costs, it is necessary to provide for work on a fairly extensive scale in order to bring these down within reasonable limits. By a fairly extensive scale I mean an output of 10,000 to 20,000 tons of limestone a year with up to date plant and a railway connection between the quarries and the metre-guage—somewhere in the neighbourhood of Bansandra or Yelladbagi—a distance of about 12 miles.

7. On this scale burnt lime might be delivered at the Railway Station at about Rs. 12 to 15 per ton and crushed limestone about half this price. Transport charges from there to Birur or Tarikere should be under Rs. 2 per ton and planters would have to make their own arrangements about bagging, if necessary.

8. The crushed limestone would contain about 50% of lime (Cao) and the burnt lime about 85%. Burnt shell lime from the coast contains about 90% Cao and burnt kankar probably 65% or often less.

9. It will require approximately 1·7 tons of crushed limestone to yield the same amount of Cao as 1 ton of burnt lime. The relative advantages depend on the results obtained, prices and cost of carriage, and it might be remembered that the burnt lime increases rapidly in weight and bulk owing to air-slaking.

10. Enough has however been said to give the members of your Association an idea of the fundamental facts of the case, and each can figure out for himself the approximate costs at his estate.

11. As I have said we do not know enough at present to justify expenditure on a plant, and war conditions would render the obtaining of plant difficult and expensive. In the meantime the members of your Association might contribute material assistance by furnishing figures as to their probable requirements.

12. How many would be prepared to use lime for their crops and what is the total acreage on which it would be used? Supposing that 1 ton of burnt lime or 1¾ tons of crushed limestone is required per acre every five years we can obtain a rough forecast of probable yearly requirements.

13. It would be very desirable to obtain a rough estimate on these lines or modified according to the experience of Planters and their advisers, and I should be glad if your Association would take the matter up and inform me of the results. The prospects of a large demand would undoubtedly expedite matters.

I have the honour to be be,

Sir,

Your most obedient servant,

W. F. SMEETH,

Director,

Department of Mines and Geology.

The Planters' Chronicle.

RECOGNISED AS THE OFFICIAL ORGAN OF THE U. P. A. S. I., INCORPORATED.

(Secretary's Registered Telegraphic Address "Planting," Bangalore.)

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THE U. P. A. S. I.

(INCORPORATED.)

Contents.

"Not once or twice in our old Island Story
The path of duty is the path to glory"

and it is with deep regret we announce the death of Captain J. A. Graham of the Lincolns. No details are to hand but we have no doubt but that he died gloriously and as he would have wished, for King and Country. By Coorg Planters especially his loss will be mourned deeply. Our friend had distinguished himself in the South African War and had won the D. C. M. and only lately he had gallantly earned the Military Cross. In 1914 he was elected Vice Chairman of the United Planters' Association, and would no doubt have later filled the responsible position of Chairman. His interests in planting politics was increasing year by year. The whole planting community will sorrow at the loss of so much promise. The heartfelt sympathy of all will be extended to his widow and young family and relations.

We publish from the Scientific Department an interesting note on Golden Drop coffee and Composition of Hevea Rubber Trees.

"Green Bug" sends us some more Odds and Ends for which we are grateful.

From the Board of Trade Journal we publish information on the Chemical Fertiliser Industry in Russia.

We publish the proceedings of the Combined Travancore Planters' Association, the resolutions of which are of vital importance to all Tea Planters.

SOUTH INDIAN PLANTERS' WAR FUND.

	Rs.	A.	P.
Amount previously subscribed	38,139	3	0
Messrs. Barber and Pascoe	150	0	0
Mr. J. H. Ellis	200	0	0
„ C. A. Mackenzie	75	0	0
„ J. M. Wilkie	40	0	0
„ A. Yates	60	0	0
Total ...	38,664	0	0

SCIENTIFIC DEPARTMENT, U. P A. S. I.

Golden Drop Coffee.

A North Mysore Planter has been good enough to provide me with the following facts and figures relating to a field of Golden Drop Coffee picked separately this year.

The yield worked out just over six cwts. per acre, but it is only fair to point out that the adjoining field of Coorg Coffee did better still. This year in this part of North Mysore all the crop was on the top of the Hills, lower down the valleys there was nothing.

The following figures are of great interest:—

Ordinary Arabica Coffee.—441 bushels. Average weight per bushel on arrival at Curing works 30'17 lbs. Average weight after drying 28'6 lbs. Out-turn 101'55 bushels per ton.

Golden Drop Coffee.—39 bushels. Average weight per bushel on arrival at Curing works 30'8 lbs. Average weight after drying 28'6 lbs. Out-turn 93'13 bushels per ton.

The Out-turns are very poor this year in Mysore due to the bad season. Last year Out-turns from this Estate averaged 86 bushels to the ton, the highest being 88 bushels and the lowest 85 bushels per ton. This year the highest out-turn on the same estate is 101 bushels and the lowest 92 bushels per ton.

Ordinary Arabica Coffee.					Golden Drop Coffee.				
	cwts.	grs.	lbs.	%		cwts.	grs.	lbs.	%
A ...	42	1	10	34'6	A ...	2	2	6	30'8
B ...	39	3	14	31'9	B ...	2	3	16	40'9
C ...	14	0	23	11'4	C ...	...	3	25	11'7
P B. ...	17	2	24	14'2	P.B. ...	1	1	16	16.8
T. ...	10	1	21	8'3	T. ...	...	2	5	6'5
Black ...	...	...	2	...	Black ...	...	...	1	...
Refuse ...	...	...	5	...	Refuse ...	...	...	1	...
Stones ...	...	...	1	...	Stones ...	...	...	...	...
Total ...	124	2	16	...	Total ...	8	1	4	...

A comparison of the above figures shows that though Golden Drop is smaller, containing as it does a smaller percentage of A, it contains more B and 71'7% of A and B together as compared with only 66 5% in the ordinary Arabica. The proportion of C is much the same in each sample, but the Golden Drop has more pea berry and less triage. This latter fact is of importance since in forward contracts 7% of Triage is allowed. Moreover the Golden Drop is heavier.

These figures are from one estate only and for one year only. It would be of great interest if other Coffee planters would publish figures of this sort from other estates, and more interesting and valuable still if we could get them over a series of years.

Composition of Hevea Trees.

In the *Tropical Agriculturalist* for March, Mr. Kelway Bamber publishes the results of a most interesting analysis he has made of an eleven year old Hevea Rubber Tree, measuring 34 inches in girth at three feet from the ground. He obtains the following figures.

	Weight.	Crude Ash	Pure Ash.	%	Ash. 100 trees per acre.
Trunk ...	820 lbs	13 lbs	3·63 lbs	0·445	...
Leaves and Branches ...	305 lbs	19 lbs	7·75 lbs	2·54	...
Totals...	1,123 lbs	...	11·40 lbs	1·01	1,140 lbs.

Analysis showed the composition of the Ash to be—

	Wood.	Leaves and Branches.	Average.	Total per acre 100 trees.	Average amount absorbed per annum.
	%	%	%	lbs.	lbs.
Lime ...	21·20	20·00	20·60	235	21·3
Magnesia ...	6·04	6·77	6·40	73	6·6
Potash ...	14·96	10·34	12·65	144	13·1
Soda ...	14·79	15·69	15·24	174	15·8
Phosphoric Acid...	7·80	6·53	7·16	81	7·3
Sulphuric Acid ...	2·88	2·54	2·71	31	2·8

The fact that there is more Soda than Potash in the Ash points to the fact that the tree had been grown on a soil deficient in the latter.

Mr. Bamber points out that the actual Potash, Soda, and Phosphoric Acid requirements would be supplied by an annual application of 30 lbs. of Sulphate of Potash, 70 lbs. of Nitrate of Soda, and 33 lbs. of steamed bone meal.

Damage to Rubber Trees by Porcupines.

Complaints are frequently heard of the damage to Hevea trees done by Porcupines and several remedies have been suggested with doubtful success. In the *Indian Forester* (XLI.10) Mr. Baste Ram writes on the subject of the damage done by these animals in the Khair Forests (*Acacia Catechu*) and says that he has found that whitewashing the trees up to a height of two feet from the ground protects them from attack. As he points out during the rainy season the whitewash is liable to be washed off and he suggests overcoming this difficulty by mixing gum with the Lime.

RUDOLPH D. ANSTEAD,
Deputy Director of Agriculture, Planting Districts.

DISTRICT PLANTERS' ASSOCIATIONS.

Travancore Combined Planters' Association.

A Meeting of this Association was held at the Quilon Club, on 28th March, 1916 to consider what action should be taken with regard to the levying of the Export duty on Tea, grown in Travancore, by both the British and Travancore Governments. Those present were Messrs. J. A. Richardson (Chairman), H. C. Westaway and T. C. Forbes, Central Travancore Planters' Association, John Stewart and A. W. Leslie, South Travancore Planters' Association, John Mackie representing Messrs. Harrisons & Crosfield, Ltd., and J. A. Gwynne, (Honorary Secretary. *Visitor.*—Mr. E. Lord.

After discussion the following resolution was proposed by Mr. Stewart seconded by Mr. Westaway and carried and the Honorary Secretary was requested to forward copy of same to the Dewan of Travancore.

"This meeting protests against the Tax on Tea as imposed at present "by the Travancore Government and the British India Custom Authorities. "The meeting cannot think that it is the wish of the authorities that "Travancore grown tea should pay a double duty and request that steps "be taken at once to determine who is to get the Tax."

"It is also requested that all teas sold on forward contract prior to "the 29th of February 1916, be exempted from the duty. Provided it "is agreed that the Travancore Government get the Tax it is requested "that all Teas sold for consumption in the Empire of India be exempted "otherwise Travancore grown Teas will be at a great disadvantage over "Teas grown in British India."

A Deputation consisting of Messrs. Richardson, Stewart and Westaway was appointed to meet the Dewan on the following day to discuss the resolution.

This being all the business the meeting closed with a vote of thanks to the Chair.

FERTILISER.

The following information regarding the artificial fertiliser industry in Russia is extracted from an article which has appeared in the Russian press:—

Chemical Fertiliser Industry

The use of chemical fertilisers for agricultural purposes is comparatively little practised in Russia, partly owing to the primitive and unintensive methods of agriculture, and partly owing to the difficulty of obtaining an adequate supply of manure. Artificial manure stands at a price which renders it inaccessible to a large number of farmers.

The principal kind of chemical fertiliser in use in Russia is Phosphates, which are imported in considerable quantities from Western Europe. Although there are in Russia various phosphate deposits, up to the present they have been little exploited, and the bulk of the quantity used has been

imported from abroad. Factories producing phosphates hardly exist in the interior of Russia, and until this state of affairs is changed the present high prices for imported fertilisers must necessarily continue to be paid. Nevertheless, experiments in the use of such fertilisers have proved so satisfactory that recently their use has considerably developed.

Of the total supply up to the present, about 79 per cent. has come from abroad and the remainder from Russia manufacturers. The greater part of the fertilisers manufactured in Russia came from factories in Poland which in consequence of the war were obliged to decrease their output. In addition to this, the extensive requisitions of cattle and horses for army purposes has still further reduced the supplies of natural manure.

Sulphate of Ammonia and "blood meal," which constituted articles of export from Russia before the war, will now have to be used for home consumption.

The alkaline salts which used to be imported from Germany to the extent of over 1,607,000 cwts. might to some degree be replaced by ashes, which at present are left unused. They are produced at present only by some small factories which make potash from sunflower seeds and tobacco, exclusively for foreign export. The importance of alkali for so many industries, which in the past have depended upon imports of this material from Germany, render the question of production of this article in Russia a matter worthy of the most serious consideration.

Experiments made by the Moscow Agricultural Institute have shown the possibility of producing alkaline salts of high percentage from the products of the Crimean Salt industry. There are also deposits in the districts of Iletzkaya Zashchita and the borders of the White Sea, containing a mineral yielding alkali and phosphorus which have not yet been touched. Further progress have been made with the exploitation of alkaline deposits near Kalusha in Russian Galicia.

Phosphate manures are of first-rate importance for Russia, and out of the total quantities of the artificial manures (13,000,000 cwts) used during the last year, about 11,000,000 cwts. were of this kind. Of these about 6,000,000 cwts. were superphosphates, and about 5,000,000 cwts. basic slag.

The home production of basic slag is centred in three factories in Sartan, Taganrog, and Kertch, with annual output of 1,250,000 cwts; that of superphosphates (7 factories) has reached a little over 2,000,000 cwts. This backwardness of the industry is explained by the expense of the installation of factory plants, due to the high tariff on machinery, apparatus, acid-resisting bricks and sacks.

Another circumstance limiting the development of the industry is the distribution of the factories, which are all either in Poland or near the sea, working on raw foreign material from Africa, America Sweden and Spain. Since 1908 a geological survey carried out by the Moscow Agricultural Institute has revealed the existence of Phosphate deposits in the surveyed districts to an estimated amount of nearly 291,000,000 tons. The Ministry of Agriculture has also attempted to foster the development of the superphosphate industry in the central and eastern regions and to interest the chemical factories all along the Volga in its possibilities.—*The Board of Trade Journal.*

ODDS AND ENDS.

By "Green Bug."

The Government of Ceylon has communicated to the Chamber of Commerce there that it has been decided that all Enemy Firms in the Colony shall be completely liquidated, and that steps to that end will be taken at an early date.

211,629,777 lbs of Tea were exported from Ceylon during 1915, which is 16½ million lbs in excess of the shipments made in any previous year. The bulk of this increase was absorbed by Russia and the United Kingdom, whilst there were also largely increased shipments to Egypt, no doubt to supply the troops stationed there and elsewhere in the Near East. The average price of 56¾ cents per lb. realised for the 89 million lbs. of tea sold on the local markets is a record.

The following *communique* has been issued by the Government of India:—The Government of India have observed in a Calcutta newspaper of the 15th Instant an article purporting to be an account of an interview between a deputation of the tea trade and the Finance Member, Sir William Meyer, in connection with the Budget. This account is incorrect and misleading in several important particulars, and the Government of India desire to make known the actual facts. In the first place, the interview was not with the Finance Member, but with the Member for Commerce and Industry, Sir William Clark. In the next place, according to the published account, Sir William Clark, is represented as having given an assurance that should the revenue exhibit the necessary recuperative power when war conditions had passed away the tax would be withdrawn. This is entirely incorrect. Sir William Clark expressly stated that he could in no way commit the Government to give any such assurance, but he undertook to bring the wishes of the trade to the notice of the Finance Member. With regard to exemptions the principal point discussed was whether the exemption of forward contracts should apply only to teas bought on order from foreign purchasers at the Calcutta auctions prior to 1st March. It was urged by the trade that the amount of teas bought at the auctions by shippers or others on their own account and not on order from foreign purchasers was insignificant, and that if these also were exempted it would save a great deal of inconvenience to all concerned, while the loss of revenue would be practically negligible. This point of view was accepted by Government who accordingly ordered the exemption from export duty of all teas sold at auctions up to and including February. A further suggestion that the exemption should be extended to all teas of last season was not accepted by Government.

The Travancore Durbar has issued a notification that a duty will be levied on Tea exported from the State, both by land and sea, amounting to Rs. 1-8 per 100 lbs. on and after the 1st April 1916. Tea waste is exempted from this duty.

Mr. H. L. Pinches of the High Range has recently interviewed the Dewan of Travancore on behalf of the Planters in connection with certain difficulties which arose with regard to the method of collection the new export duty on Tea. Two courses are now proposed; one to pay the amount of the duty into the nearest convenient Sirkar Treasury and send a copy of the Treasury receipt by those in charge of the Tea chests to be shown to the Customs officials when the Tea is passed through; the second to issue a cheque on the Bank of Madras in favour of the Dewan of Travancore for the amount of the duty and present this to the Customs officials. With regard to the difficulty which arose over the reweighing of the Tea chests by Customs officials, the Dewan has agreed to accept the weights given on the invoice and the invoice should be sent along with the Tea for production before the Customs officials. In view of the fact that much of the Tea in Travancore reaches the port of export in boats by the backwaters arrangements of this sort are necessary to avoid delays and inconvenience.

The Darjeeling Planters Association have passed the following resolution:—"That this meeting views with alarm, and wishes to register its strong protest against, the principle of the export tax which the Government are about to levy upon tea, as being in the nature of a direct bounty to foreign countries also producing the same article."

It is announced that the sixteen enemy firms trading in Calcutta which were licensed to liquidate after the outbreak of war have now completed the transaction and deposited their assets with the Controller. The Bengal Chamber of Commerce has asked the Government for information as to the action which has been, or is going to be, taken with regard to the disposal of these assets, for it is of the opinion that it is of the highest importance that all stocks etc. should be realised at the earliest possible moment.

A London telegram states that in the House of Lords Lord Sydenham called attention to the fact that much enemy goods were still entering India 'The Grovernment are anxious to stop this as far as possible and a Bill will shortly be introduced into the Legislative Council to permit the seizure of suspected goods. The Indian Customs are now scrutinising very closely all consignments and the recent publication of a black list of firms with which trade is prohibited strengthens their powers.

The pumping and boring operations now under the control of the Director of Industries in Madras are about to be transferred to the Department of Agriculture, and in consequence a qualified Agricultural Engineer on the staff of the Agricultural Department, an addition to the cadre that has often been asked for, has now become a necessity. H. E. the Governor in Council has sanctioned the creation of the post of Agricultural Engineer on a salary of Rs. 400—25—800 as also that of an Assistant Engineer on a salary of Rs. 200—$2\frac{1}{2}$—400. Both posts will be treated as gazetted appointments. This will be a welcome and valuable addition to the efficiency of the Madras Agricultural Department.

TEA.

Markets, Prices and Statistics.

For the week ending 17th February public sales of Tea in London totalled 56,400 packages, including 4,300 from South India. Fair common pekoe souchong was steady at 9½*d.* per lb. For 55,209 packages, including South Indian, on Garden Account 10·64*d.* per lb. was obtained as compared with 10·61*d.* per lb., for 54,700 packages in the previous week and 10·08*d.* per lb., for 60,200 packages in the corresponding week last year.

The Indian Tea Association issues the following figures :—

Black Tea exported to the United Kingdom from

	Calcutta.	Chittagong.
First half of March 1816 ...	5,350.070	4,551,335
Same period 1915 ...	676,964	nil
Total 1st April 1915 to 15th March 1916 ...	173,711,905	53,107,647
Total	...	326,626,119
Total same period 1914-15 ...	...	228,939,651

The Colombo Tea Traders Association publishes the following Averages of price for South Indian Teas sold at public auction for the twelve months ending 31st December, 1915 in Colombo.

Estate.	lbs.	Av. cts.	Estate.	lbs.	Av. cts.
Moradukande ...	11,987	51	Vagavurrai ...	47,302	53
Kannis-mallay ...	690,933	61	Olivers ...	3,010	53
Ibex Lodge ...	69,371	61	Periakanal ...	34,094	52
Chittavurrai ...	306,930	60	Devicolum ...	31,305	52
Thia Shola ...	88,406	60	Luckham ...	15,758	51
Pillioor ...	69,328	60	Pullikanam ...	6,320	51
Glen Morgan ...	45,837	60	Kodenad ...	10,855	50
Madupatty ...	644,359	59	Stagbrook ...	8,206	50
Sothuparai ...	321,809	59	Kolam ...	14,230	49
Dunsandle ...	15,315	59	Yendavar ...	20,770	47
Minaar ...	75,094	57	Pusumallai ...	18,673	47
Letchmi ...	10,505	57	Periavurrai ...	20,051	46
Guernsey ...	7,835	57	Chokanad ...	5,967	45
Cherakara ...	24,664	56	Periakaramullai ...	7,780	44
Frith Hall ...	15,602	56	Somerdale ...	2,524	44
Woodcote ...	2,000	56	Vembanard ...	5,165	43
Pullivasel ...	286,731	55	Thungamallay ...	2,511	43
Kelaar ...	77,444	55	Bon Accord ...	1,950	41
Ariankew ...	35,023	55	Braemore ...	1,559	40
Paravanthanam ...	5,994	55	Haileyburia ...	4,960	39
Sevenmallay ...	123,643	54	Churamoni ...	55,740	38
Norwood ...	17,210	54	Kalickanan ...	14,316	38
			Poonmudi ...	4,170	38

Coffee receipts to 18th February were—

	1915-16.	1914-15.
Rio	2,608,000	1,951,000
Santos	10,003,000	7,691,000
Total ...	12,609,000	9,642,000

R. D. A.

ON INSECTS.

BY

E. A. ANDREWS, B. A.

PART IV.

The next order of insects with which we have to deal is the *Hymenoptera*. This group is remarkable, both on account of the high intelligence of many of its members, and of the high degree of specialisation to which many forms have attained, and, containing as it does the ants, bees, wasps, saw-flies, and parasitic ichneumon flies, is of great economic importance.

The members of this order are provided with two pairs of membranous wings, the hind pair usually slightly less than the front pair, which are generally colourless and transparent, but in some cases, as in the familiar carpenter bees, (*Xylocopa*), may be pigmented. Sometimes, as in the worker ants, the wings are absent. Many members of this group have biting mouthparts, that is to say the mouth is provided with a labrum, or upper lip, two pairs of biting jaws, the upper pair being known as the mandibles, the lower pair as the maxillae, and a labium, or lower lip. In some of the higher forms, however, the lower pair of biting jaws (maxillae) and the lower lip (labium) are modified to form a sucking or lapping apparatus, while the upper lip (labrum) and upper pair of jaws (mandibles) retain their original biting form. This modification is found in the bee, the biting parts being mainly used for industrial purposes, and the sucking parts for feeding. A third feature of the insects of this order is the presence, at the hind extremity of the abdomen of the female, of a saw, as in the saw-flies, a sting, as in the wasps and bees, or an egg-laying apparatus, or ovipositor, as in the Ichneumon flies. The changes of form undergone by the insects of this order during their life history are great, and the four stages described in Part II of this series of articles are distinctly defined. The larva in most cases takes the form of a white, fleshy, footless grub, as in the case of the wasp grub, with which all fishermen are familiar, and this grub is usually dependent on the parent for food, if not parasitic, when it is of course dependent on its host. In some cases, however, the larva is active and can forage for itself, as in the case of the saw-fly, whose larva is similar to a caterpillar in form, and feeds on the foliage of plants. The pupa is characterised by the fact that all the appendages of the adult body (antennae, legs, wings), which are developed in this stage, are not enclosed in the main part of the pupal case, but hang free from it, each being enclosed in a delicate skin of its own.

We have stated above that the order *Hymenoptera* is remarkable alike on account of the degree of specialisation found in the group, as well as on account of the high intelligence of many of its members, and before proceeding to describe the various divisions of the order, it may be of interest to discuss these questions in a genaral way. All know how powerful many members of this order are when on the wing, and must have often noticed the familiar digger wasps, which can fly away to their nests bearing

in their grasp insects as large as themselves. Now the wings are worked by muscles which are attached by their other end to the skeletal portion of the thorax. These muscles become greatly developed in insects with powerful flight, and the skeletal portions need to be heavier and stronger. Hence we find that considerable modifications have been undergone by the thoracic segments of many *Hymenoptera*, resulting in the enlargement and strengthening of the thorax, which is in some species greatly developed. A further peculiarity of many *Hymenoptera* is the small "waist," which gives the abdomen a great range of movement and enables the insect to direct its sting or ovipositor with speed and great accuracy. This peculiarity is also found in the digger wasps. Such modifications are connected with the habits and economy of the different species. The digger wasp must be a powerful flyer in order that it may carry away the insects which serve as food for its young, and it must also be able to place its sting with perfect accuracy in order to paralyse its prey without killing it, so that it may remain undecomposed until the young are ready to consume it. But specialisation has gone further than this in many *Hymenoptera*. Not only do we find that different species show special modifications, but also that various members of one species may be modified in different ways in accordance with different functions performed by them. Such a modification occurs for instance in the velvet ants (Mutillidae). The female spends the whole of her life on the ground, and is small and wingless. The male, on the other hand, is winged, and much larger. By means of his wings he is aided in his search for the female, and his larger size and greater power enable him to carry the female to a convenient place for mating. It is in the social insects, such as the ants and bees however, that this specialisation has been carried to a maximum. Each member of the colony has certain definite tasks to perform, and is so constructed as to be able to perform those tasks, and no others. In the ants, for example, we find several castes. The "workers" are active and wingless, with imperfect reproductive organs, and undertake the collection of food, the construction of the nest, and take care of the young. In some species there may be as many as three forms of worker. The "soldiers" are also active and wingless, and are provided with a large head and formidable jaws. They, like the workers, do not reproduce their kind. The adults, or reproductive individuals, have perfectly developed, reproductive organs and wings, and their sole function is to reproduce and disseminate the species. One of the most curious instances of specialisation is to be found in the honey-pot ant of Mexico. In this species certain of the workers are used as honey-pots, for the storage of honey collected by the ordinary workers. The latter, after feeding the hungry members of the colony, give the surplus honey to individuals which remain suspended from the roof of a special chamber of the nest. These individuals swallow the honey, and become distended to an enormous extent, and it is supposed that they act as living honey-pots, and store the food until it is required by the colony. Other honey-pot ants, belonging to a different tribe, are also known from Australia and South Africa, the same peculiar specialised habit thus having arisen independently in different species and in different parts of the world. In the social bees, also, we find that certain members of a Colony are modified as workers, while the queens, and drones (males), carry on the race. Specialisation has also occurred in the modifications of the mouthparts, and in the special construction of the legs for the collection of pollen.

(To be Continued.)

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THE U. P. A. S. I.

(INCORPORATED.)

Contents.

The Deputy Director of Agriculture has gone on tour to the Anamalais, and will not probably return till about the 25th instant.

We publish the proceedings of the Wynaad Planters' Association and the North Mysore Planters' Association.

A long and valuable article full of figures on Markets, Prices and Statistics relating to Tea, Coffee and Rubber has been supplied by R. D. A.

The Director of the Labour Department whose interest in the welfare and health of coolies is so well-known, has asked us to give circulation to the Government order on Malaria.

We conclude the interesting article on "Insects by E. A. Andrews, B. A."

The Honorary Secretary, the Overseas Club, acknowledging receipt of subscription writes "Permit me to thank you most cordially for your valuable help towards the Overseas Air Craft Fund. I know you will be gratified that as a result of the appeal to our generous friends overseas, nearly 50 units are now in existence."

SOUTH INDIAN PLANTERS' WAR FUND.

	Rs.	A.	P.
Amount previously subscribed	38,664	3	0
Mr. S. Bayley	10	0	0
„ G. D. Atkins	20	0	0
„ S. Sladen	100	0	0
Billiard Room of the Ootacamund Club ...	400	0	0
Sir Fredrick Price £5	75	0	0
Messrs. Harrisons and Crosfield, Ltd... ...	1,500	0	0
Malayalam Rubber and Produce Co.	1,000	0	0
East India Tea and Produce Co.	750	0	0
Meppadi Wynaad Tea Co., Ltd.	500	0	0
Wallardie Tea Estate, Ltd.	500	0	0
Total Rs...	43,519	3	0

OVERSEAS AIR CRAFT FUND.

Balance	80	0	0
Mr. E. H. Francis	10	0	0
Total Rs...	90	0	0

DISTRICT PLANTERS' ASSOCIATIONS.

Wynaad Planters' Association.

Proceedings of a General Meeting held at the Meppadi Club on March 22nd 1916.

PRESENT.—Messrs. Bisset, Blackham, Copland, Gauld, Gillatt, Leslie Macleod, Malcolm, Powell, Stewart, Vernede, Vinen and C. E. Abbott (Honorary Secretary).

Mr. Malcolm in the chair.

2220. The chairman proposed a resolution of regret and sympathy with the relatives of the late Mr. E. H. F. Day, Deputy Director of the Labour Department and for several years a Member of this Association: Also a similar resolution at the death of 2nd Lieutenant J. C. Stewart I. A. R. O. 32nd Light Cavalry, also a member of this Association, who has been killed in action in Mesopotamia.

Passed. All Members standing.

The Honorary Secretary was instructed to write to the relatives of Mr. Day and Mr. Stewart expressing the great regret that was felt in the District at the news of their deaths.

2221. *Proceedings of last Meeting.*—These were confirmed.

2222. *Coca Cultivation.*—Read letter from the Assistant Commissioner, Salt and Abkari, Calicut, regarding Coca cultivation in Wynaad, and the Honorary Secretary's reply. Recorded.

2224. *Poodoopardy Hotel.*—A grant of Rs.50 for repairs has been passed.

2225. *Experimental Stations.*—Read letter from the Secretary U. P. A. S. I. stating that, subject to confirmation, the Scientific Committee in consultation with the Scientific Officer has selected the following sites for the first 3 experimental stations.

Tea	Peermade.
Rubber	Pallapillay District,
Coffee	Coorg Mysore Boundary.

Resolved that this Association has no objection to offer.

2226. *Magistrate at Pootoomulla.*—Read letter from Mr. Macbain to Honorary Secretary asking him to address the Collector on the subject of allowing the Vayitri Magistrate to visit Pootoomulla once every two months, and the Honorary Secretary's letter to the Collector of Malabar. Recorded. The Honorary Secretary to write to Mr. Macbain.

2227. *Root disease in Tea.*—Hymenochaete Noxia. Read letters from Mr. Malcolm, Mr. Anstead and Mr. Macræ regarding a diseased blackwood root that appeared to have killed a tea bush. Mr. Macrae thinks that this is an instance of Hymenochaete Noxia described in *Planters' Chronicle* Vol. 7 p. 57. Members who may find further specimens are asked to send them to the Deputy Director.

2228. *Water Hyacinth.*—A Pamphlet forwarded by Mr. Chadwick, Director of Agriculture, with a drawing of this pest was circulated at the Meeting. It is now exhibited on the Club board.

2229. *Amendment of Labour Law.*—Read letter from the Collector of Malabar informing the Association that Government contemplates amending section 35 and asking for the opinion of the Association. Read Honorary Secretary's reply. After a full discussion the following resolution was proposed by Mr. Bisset seconded by Mr. Gillatt and carried unanimously.

That this Association approves of the Honorary Secretary's letter to the Collector of Malabar. The Association considers that section 35 is a vital one, and that no case has been made out for its amendment. It considers that it is a decided deterrent to deliberate fraudulent breach of contract and that it has not been misused.

The Honorary Secretary was instructed to communicate with the Honorary Secretary, Nilgiri Planters' Association, on the subject.

A vote of thanks to the chair terminated the Proceedings.

(Signed) B. MALCOLM,
Chairman.

(„) C. E. ABBOTT,
Honorary Secretary.

North Mysore Planters' Association.

Proceedings of a Quarterly General Meeting held at Balihonnur, on Monday, the 27th March, 1916.

PRESENT:—Messrs. C. Danvers (Chairman) C. P. Reed, F. I. Morgan, R. G. Foster, C. S. Crawford, G. V. R. Frend, F. W. Hight, C. C. Kent, (Honorary Secretary). *By Proxy.*—Mr. S. L. Mathias. *Visitor.*—Mr. H. G. Bower.

Before opening the meeting the Chairman said:—

"Gentlemen,—We have to deplore the death of one of our most popular members, the late Mr. H. G. Bonner, who has passed away since our last meeting. I was one of the oldest friends of Mr. Bonner, but will carry the opinions of all with me when I say that his pluck, his absolute straightness in all ways, and the sweetness of his disposition made him both loved and respected by all who knew him. He will be a great loss to our community, and we are not likely to see his like again soon."

The Chairman proposed that the Honorary Secretary be asked to write to the members of his family expressing the sympathy of the Association. Carried unanimously, all members standing.

The minutes of the previous meeting were taken as read.

Labour Rules—(1). Read letter from Mr. L. D'Souza. It was resolved after long discussion that the Honorary Secretary inform him that Rule 11 covers all old debts of a cooly to his recruiter, and that Rule VI refers to new advances, which must not aggregate more than Rs. 25 for 1916, including any old balance taken over, as such balances must be considered a new advance when a cooly changes hands.

(2.) *Stamp Vendors.*—Read letter from the Deputy Commissioner and it was noted that the Postmasters of Balur and Balihonnur would be granted licences to vend stamped papers as soon as a reply had been received from the Superintendent of Post Offices. A list of the present stamp vendors in the Kadur District was circulated. The Honorary Secretary was requested to thank the Deputy Commissioner for having met our wishes in the matter.

(3). *Printed Stamped Agreement Forms.*—The Honorary Secretary was requested to continue correspondence with the Labour Department with a view to having a suitable agreement with coolies and Maistries drawn up to be eventually printed on stamped papers.

New Varieties of Coffee.—Letters under this heading from the Deputy Director of Agriculture, Planting Districts, were read with interest. Mr. F. I. Morgan kindly undertook to make a small experimental nursery with the Marigogipe seed received. With regard to the offer of seed from British East Africa by Mr. H. L. Andrews, it was resolved that as several members present expressed their willingness to experiment with this variety, the Honorary Secretary be requested to write for 2 bushels through Mr. Anstead.

Balur Dispensary.—Read letters from the Senior Surgeon, Mysore Government and it was noted with regret that Government were not in a position to go on with this much needed Dispensary at present.

Roads.—It was regretted that no reply had been received by the Honorary Secretary to his letters to the Superintending Engineer, Northern Circle on the subject of the Balihonnur—Magundi—Balur road. The Honorary Secretary was requested to make further representations on the matter through the Deputy Commissioner.

Read letter from Mr. C. H. Godfrey anent the Handi—Aldur road. The Honorary Secretary was requested to instruct the members of the Kadur District Board to further press the matter, and if the old answer of "No funds" be again given, to suggest that the claims of this much used road should be considered in preference to others on which there is less traffic.

European Doctor for the Planting Districts.—It was suggested that a committee of those interested in the scheme be formed to go into the matter.

Sanderson Ward Store Room.—It was resolved that the Honorary Secretary be requested to write to the Bababudin Planters' Association asking for detailed information of the scheme.

Experimental Coffee Station.—Read letter from the Secretary, U. P. A. S. I. anent proposed localities of Experimental Stations which was approved.

Miscellaneous.—Read letter from Mr. C. H. Godfrey anent Re-Survey Officials and the Honorary Secretary was instructed to make representations to the Deputy Commissioner on the subject.

Read letter from the Amildar, Koppa Taluk, and Mr. R. G. Foster was elected to represent the Koppa Taluk on the Kadur District Board.

Read letter from Mr. S. L. Mathias and a copy of Naraina Pai's Ready Reckoner was circulated.

Letters from the Secretary, U.P.A. anent the Rubber Growers' Association placed on the table.

Subscription list to the Daly Memorial Hall circulated.

(Signed) C. C. KENT,

Honorary Secretary.

TEA.

Markets, Prices, and Statistics.

The following figures are issued by the Indian Tea Association :—

Black Tea.	1916. lbs.	1915. lbs.
Sailings to Great Britain in February—		
From Calcutta	10,968,228	6,085,894
From Chittagong	4,408,027	278,930
From 1st April 1915 to 29th February 1916 ...	213,834,488	222,311,739
Sailings to Australia and New Zealand—		
In February	552,519	719,707
From 1st April 1915 to 29th February 1916 ...	9,222,297	10,692,664
Sailings to North America in February ...	511,887	305,494
From 1st April 1915 to 29th February 1916 ...	11,575,318	8,237,096
Sailings to other places in February ...	6,183,011	5,672,422
From 1st April 1915 to 29th February 1915 ...	50,735,507	29,109,036
Shipments from South Indian Ports—		
In February	1,718,646	619,694
From 1st April 1916 to 29th February 1916 ...	19,230,734	18,681,391
Total sailings from 1st April 1915 to 29th February 1916 ...	304,598,344	289,031,926

SAILINGS FROM SOUTH INDIAN PORTS.

Cochin—	
To Asiatic Ports	7,990
Tuticorin (direct)—	
To London	1,456,066
To Colombo	197,145
Calicut—	
To Mombasa	192
To Bombay	5,763
To Karachi	1,298
To Baherin	1,092
To Mulki	100
Total...	1,718,646

Messrs. George White and Co., report for the week ending 24th February that 53,400 packages of Tea including 2,900 from South India were catalogued in the London market. Fair common pekoe souchong sold at 8¾d to 9d per lb. The South Indian selection was less attractive than of late and prices were a shade lower. For 54,000 packages, including South Indian, on garden account 10·41d per lb. was obtained as compared with 10·64d per lb for 53,200 packages in the corresponding week last year.

SOUTH INDIAN TEA SOLD MARCH 1ST, 6TH, AND 8TH.

Travancore—	Packages.	Average.
Chokanad	123	11 *d.*
Glenmary	111	10 *d.*
Gundumallay	110	11¼*d.*
Kalaar	97	10¼*d.*
Ladrum	103	10¼*d.*
Letchmi	209	10½*d.*
Nullatanni	241	9¾*d.*
Sevenmallay	65	11 *d.*
Wynnad—		
Askern	112	9¾*d.*
Erramaculla	80	9¼*d.*

South Indian Teas sold in London up to 16th March, 1916.

	B.O.P.	B.P.	Pekoe.	Pek. Sou.	Pek. Fring.	Dust.
Munja Mullay ...	11⅜*d.*	11*d.*	10½*d.*	10 *d.*	10¾	9¾*d.*
Thengakal ...	11½*d.*	11*d.*	10¼*d.*	9½*d.*	10¾	9¼*d.*

Coffee.

East Indias—		1914.	1915.	1916.
Landed to 29th Feb.	... Tons	—	51	290
Delivered ,, ,,	... ,,	591	586	200
Stock on ,, ,,	... ,,	738	924	330
Coffee of all kinds—				
Stock in U. K. 29th Feb.	... ,,	30,200	15,325	16,525
Total European Imports to 29th February	... ,,	70,300	95,475	147,470
Total European Deliveries 29th February	... ,,	78,760	96,830	114,530
Total European Stock on 29th February	... ,,	198,000	254,470	461,000
World's visible supply on 29th February (÷)	... ,,	547,115	589,295	760,410

(÷) *a decrease* of 40,530 tons compared with a *decrease* of 7,410 tons last year.

BRAZIL RECEIPTS TO 13TH MARCH.

1916.	1915.	1914.	1913.
13,225,000	10,608,000	12,194,000	10,245,000

Offerings in Auction have been :—

	Total since 23rd Feb.	14th Mch.	1st Jan.	Last year to 17th Mch.
East India (new crop) ...	Nil		Nil	1,315
Costa Rica ...	11,757		25,922	25,050
Other Milds ...	7,366		39,154	43,066
Brazil ...	3,458		11,059	41,543
Robusta ...	102		248	8,947
East Africa & Uganda ...	1,304		5,300	2,675

The Coffee market remains good. No new East Indias have come up yet—some have been in dock for a fortnight but work is very slow.

Export restrictions must at last be telling in Germany as "free" Coffee in Holland—*i.e.* Coffee, not controlled by the N. O. T. has had an extraordinary rise. Robusta has gone up about 50/ per cwt. in the last few weeks while N. O. T. Coffees have only advanced about 10/. To protect their own supplies the Dutch Government is considering the question of prohibiting export—already forbidden by Sweden and Denmark.

Rubber.

During February Plantation Rubber with the exception of slight fluctuations gradually advanced from 2/11 for spot standard quality. Crepe on 1st February to 3/8½ at the end of the month. The highest price realised for this grade was 3/9 on 28th but this was followed the next day by a decline of ½*d* per lb., owing to lack of demand. Ribbed Smoked sheet realised from ¼ to 1*d*. below the ruling price of Crepe.

Messrs. Lewis and Peats Reports are as follows:—

	8th March.	15th March.
Crepe ...	3/8	3/8
Sheet ...	3/7¼	3/6

The Pará Market is dull. Closing prices on 15th March were March & April 3/2. April & May 3/2¼. May & June 3/2¾.

Overseas Trade in February.

RUBBER BY QUANTITY.

Imports of Rubber.	1914.	1915.	1916.
From Dutch East Indies (Centals of 100 lbs.) ...	N. S.	3,144	4,416
,, French West Africa ,, ...	745	664	490
,, Gold Coast ,, ...	765	183	1,005
,, Other Countries in Africa ,, ...	N. S.	792	8,559
,, Peru ,, ...	252	96	2,728
,, Brazil ,, ...	41,164	23,204	23,836
,, British India ,, ...	N. S.	3,480	1,247
,, Straits Settlements and Dependencies, including Labuan ,, ...	32,270	52,463	32,637
,, Federated Malay States ,, ...	19,538	16,879	10,966
,, Ceylon and Dependencies ,, ...	18,210	35,347	15,738
,, Other Countries ,, ...	31,660	2,970	1,252
Total Imports ,, ...	144,604	139,222	102,874

Re-Exports of Rubber.	1914.	1915.	1916.
To Russia (Centals of 100 lbs.) ...	12,620	11,707	10,276
,, Germany ,, ...	18,721	—	—
,, Belgium ,, ...	5,313	—	—
,, France ,, ...	12,569	12,192	18,939
,, United States of America ,, ...	31,982	74,544	56,669
,, Other Countries ,, ...	8,098	12,782	13,330
Total Re-Exports ,, ...	89,303	111,225	99,214

R. D. A.

LABOUR DEPARTMENT.

The Director of the Labour Department requests that all complaints about the working of the Department be addressed to him direct.

Bangalore, 4th April, 1916.

AYLMER Ff. MARTIN, *Director.*

The Director, Labour Department, asks us to publish the following "Lesson on Malaria" and to let it be known that copies in the Vernaculars can be obtained ftom the Superintendent Government Press, Madras.

Malaria.

ANNEXURE.

A LESSON ON MALARIA.

Malarial fever is a serious disease which weakens the constitution or causes the death of thousands of people—especially young people—every year. It is due to parasites which enter the blood of man through the bite of the mosquito. There are two kinds of cells in the blood, red and white. Malarial parasites attack the red cells and destroy many of them; hence it is that a person suffering from malaria becomes pale and weak. The parasites also cause a chronic inflammation of the spleen which leads to its gradual enlargement. There are three different kinds of malarial parasites; one kind multiplies in the blood so rapidly that a fresh brood is brought forth every twenty-four hours: another kind of parasite multiplies every forty-eight hours and in the third kind the fresh brood takes seventy-two hours for its production. All this multiplication takes place in the blood of man and it is just while the fresh brood is being hatched out in the blood that a person gets the attack of fever. The kind of his fever therefore depends upon the kind of parasite with which the man has been inoculated by the mosquito. The first sort of parasite will give him fever every day. The second sort will give him fever every other day, (this is the most common sort) and the third sort will cause an attack of fever every third day, supposing that in all cases the disease is left untreated.

Apart from the fact that each of the three parasites causes a different kind of fever, each of the parasites is of different appearance from the others and when the blood is examined under the miscroscope a skilled person can tell at once from the appearance of the parasite what kind of malarial fever the patient is suffering from.

The parasites may be so numerous in the blood of a person suffering from malaria that each drop contains hundreds of them. Female mosquitoes live upon blood and in order to get their meal they readily bite man and suck several drops of blood at one sitting if undisturbed. If the man on whom they feed happens to have malarial parasites in his blood many of these will find their way into the stomach of the musquito. Should the mosquito be a particular kind of anopheles some of the parasites will develop in its stomach and bore their way through the stomach wall into its tissues and eventually find their way into its salivary glands. When that mosquito bites a man it injects into his skin some of the contents of its salivary glands which causes the itching sensation with which we are all so familiar when a mosquito has bitten us; and in this salivary gland matter are the malaria parasites which have thus been transferred from one man to another. These parasites multiply in the man's blood very rapidly and when sufficient multiplication has taken place the man gets an attack of fever to be followed thereafter by attacks every 24 or every 48 or every 72 hours.

The mosquito having bitten a malaria patient cannot immediately transfer his parasite and his fever to another person. Several days (about a week) must elapse after the mosquito has swallowed the malaria blood, before the parasites find their way into its salivary glands. Nor is fever

caused immediately after the infected mosquito injects the parasites into a healthy person. The mosquito only injects a few parasites and these must multiply into some millions in the man's blood before they are capable of causing fever. Ordinarily it takes from 14 to 24 days from the date of the mosquito bite until the parasites have developed sufficiently to cause the first attack of fever.

Not all mosquitoes are capable of carrying malaria, it is only certain species of the dappled winged mosquitoes called anophelines and only their females which are thus gifted.

The other and most common kind of mosquitoes are called culicines. They do not carry malaria but they carry about from person to person the parasite known as filaria which produces a severe kind of fever which in turn may end in elephantiasis. So all mosquitoes in and about towns and villages should be exterminated, and this can be done if the people co-operate one with another.

Adult anopheline mosquitoes may be recognised by the fact that when resting on a wall they hold their bodies at an angle to it, the head, proboscis (the biting mouth parts of a mosquito) and body are in a straight line and the insect looks like a small thorn stuck slanting in a wall. Culicine mosquitoes rest with their bodies parallel to the wall and appear as hunch-backed. In anophelines the colour is light or dark brown, in culicines grey or brown or black with white bands or markings. In anophelines the wings are spotted, in culicines the wings are plain.

All mosquitoes breed in water. In water they lay their eggs, the eggs hatch in water and in from 24 to 48 hours the larvæ or wrigglers are set free therein. They must then remain beneath the water surface in order to obtain their food. They need to come to the top at frequent intervals to breathe, otherwise they would drown. They breathe by means of a siphon at the tail end of the body. The wrigglers cannot develop in damp grass or moist soil. They live in water at least one-half inch deep, so that when full grown and floating with their heads down they do not touch the bottom.

The larvæ of anophelines are easily known by their lying flat just under the surface of the water and by their moving backwards in jerks. Culicines hang in water head downwards and have a long breathing tube; they move forward with a wriggling motion.

The larvæ or wrigglers require from six to ten days or sometimes less to grow to their full size. When they have grown to their full size they suddenly wriggle out of their skin and appear as totally different insects darting about in the water. These insects are called pupæ or nymphs. This stage lasts from two to four days. Then they float on the surface of the water and from them the mosquito emerges as a winged adult, fully developed and ready as soon as it has had a meal to reproduce its kind. In three or four days she will lay her first batch of eggs upon the water and at night will go forth to suck more blood in order to lay more eggs.

Mosquitoes may breed in any collection of water in houses, pools, cisterns, drains, tanks, wells, canals, and water channels of all kinds. They cannot breed in shrubberies, crotons, flower pots, etc., unless there is stagnant water at least half an inch deep.

It is very important to prevent mosquitoes getting at the water in or near houses by keeping water vessels covered, and to prevent water collecting near houses. Any unnecessary articles that can hold water such as old and broken chatties, kerosine oil tins, broken bottles, etc., should be cleared away from houses; all pools of stagnant water near houses should be abolished by filling up the holes in which they occur. Where pools cannot be filled up, a little kerosine oil (about half a teacup for a square

yard of surface) should be thrown on the surface of the water twice a week. This kills all the larvæ. It is wise to try and kill all mosquitoes found in houses as some of them may already be infected with malaria.

So far as is known the mosquito is the only agency by which malaria is spread. Repeated experiments have proved that drinking the water from a highly malarious place will not cause malaria. If therefore there were no mosquitoes there would be no malaria and if a person can protect himself completely from ever being bitten by a mosquito, that person can never get malaria. It is for this reason that officers touring in malarial places endeavour to avoid being bitten by using mosquito nets, but as they cannot always remain under the mosquito nets they sometimes do get bitten and sometimes do get attacked with malaria.

Conversely, if there were no human beings the mosquito would never get infected with malaria and in remote jungle places where no one lives, although anophelines may be swarming, yet, as none of them can get infected, they may bite a chance visitor but cannot give him malaria. This gives us a direct clue to one of the methods of avoiding malaria. When touring in a noted malaria neighbourhood, do not, if it can possibly be avoided, camp or halt for the night in or near a village or human habitation; half a mile away will be safe. It is possible that there may be amongst one's followers in camp a person in whose blood malaria parasites already abound, but if one does not halt in the same place for a week or upwards even that servant is harmless as the mosquitoes which he infects are not capable of infecting another person until the lapse of at least seven days after biting him, so they are left behind when the camp moves and infect no one. It is the old infected mosquitoes in the neighbourhood of human habitations that are dangerous.

There is only one drug known at present which kills the malaria parasites in a man's blood and that drug is quinine. A dose of quinine taken every day may kill off the young parasites as they are injected into the body by the mosquito and so altogether prevent the development of malarial fever. When malarial fever actually occurs, large doses of quinine cure it, but to kill completely all the parasites then in the blood, it is necessary to take a dose daily for three months. For an adult the dose should be about 10 grains sulphate of quinine with one dram sulphate of magnesia (Epsom salt).

In a malarial locality almost all the children have malaria parasites in their blood and most of these children have enlargement of the spleen due to these parasites. All children who get malarial fever and all who have enlargement of the spleen should be given quinine every day for three months. This will completely cure them of malaria, but steps must be taken to protect them from being again bitten and being again infected, by destroying all the mosquitoes about their dwelling place.

Remember—

(1.) That malaria is carried from an infected to a healthy person by the mosquito and not, so far as is known, by any other agency.

(2.) That, therefore, if you have no mosquitoes or can prevent mosquitoes from biting you, you can never get malaria.

(3.) That mosquitoes breed in water only and that where there is no water there are no mosquitoes and no malaria.

(4.) That it is not necessary to destroy all the mosquitoes in a district; it is only those in and around human habitation which are dangerous. If the area for a quarter of a mile around habitation is free from breeding places, you will have few or no mosquitoes and no malaria.—*Government of Madras Local and Municipal Department.*

ON INSECTS.

BY

E. A. ANDREWS, B. A.

PART IV.

(Continued).

In addition to presenting us with wonderful examples of specialisation, the behaviour of certain *Hymenoptera* would lead us to believe that they were possessed of a great amount of intelligence, and had, moreover, solved the problem of the control of sex production. If we consider, for instance, the case of the bee, we find that the queen lays eggs which give rise to drones, workers, and other queens. The drones are the males, the queens the females, and the workers are imperfect females. All are contained, when young, in different sized cells in the nest, and no worker, drone, or queen is ever found in the wrong cell. When mating has taken place the seminal fluid of the male is stored in a special sac forming part of the generative organs of the queen, and the eggs are fertilised as they pass this sac. But a queen which has not been fertilised can lay eggs, and these all become drones. It is therefore believed that the males are produced from unfertilised eggs, the females from fertilised eggs, and that the queen can open or close the special sac and lay male or female eggs at will. Again, the female eggs may produce either workers or queens, and this is regulated by the worker bees, who feed the larvae intended to be queens on a rich honey-like syrup, while those which are to produce workers are given a less nutritive mixture of pollen and honey, known as "bee-bread," so that development does not go so far as in the case of the queen. Further examples of the control of sex-production, and of the possession of a highly developed instinct which, if not intelligence, is remarkably like it, will be given when the divisions of the order are discussed in detail.

Mention of the fact that the queen bee can produce eggs without being fertilised by a male brings before our notice a phenomenon not uncommon in the insect world, and frequent in the order under discussion, namely, that of "parthenogenesis." The term is derived from two Greek words meaning "virgin birth," and is applied to cases where a female gives birth to young without having had intercourse with a male. Partheneogenesis is of three kinds, all of which are found to occur amongst *Hymenoptera*. In the first kind the females which reproduce parthenogenetically give birth to both males and females, which can mate and produce females which again give birth, without having mated, to males and females. Such a form of parthenogenesis is found amongst the gall-flies, or gall-wasps, as they are better called. In the second kind of parthenogenesis only females are produced, and males are unknown, or produced so seldom that they are very rarely found. This form of reproduction is also found amongst the gall-wasps, and is common in saw-flies. The last kind of parthenogenesis is the one which we have already noticed in the case of the bee, in which eggs produced without mating give rise to males only, and is also known to occur amongst the ants and wasps. This phenomenon occurs amongst tea pests in the case of the tea aphis (Ceylonia theaecola).

A division of this order which is of great interest from the point of view of economic entomology is that which contains the parasitic insects, the gall-wasps, whose larvae are helpless grubs living in galls on leaves, and the ichneumons, and other parasites of insects, which lay their eggs on or in the victim, who is devoured by the resulting grub. These insect parasites may

be beneficial or harmful, according as they parasitise injurious or useful species, and they will be discussed in greater detail later. They are of very varied habits. Some lay their eggs in those of other insects; some lay their eggs beneath the victim's skin, while others deposit them on the outside, leaving the newly-hatched larvae to bore their own way in; some parasitise the larvae of other insects, some the pupae, and others the adults; some even parasitise the larvae of other insects, some the pupae, and others the adults; some even parasitise other parasites.

The order *Hymenoptera* is divided into two large and distinct sub-orders, which are sub-divided as follows:—

A. *Sessiliventres*—with the abdomen broadly attached to the thorax.

This sub-order is divided into three families, all of which are plant-feeding insects, and contains the saw-flies.

B. *Petiolata*—with the abdomen attached to the thorax by a slender stem.

This sub-order is divided into three series:—

1. *Parasitica*—with an extruded ovipositor and divided trochanter.

This series contains eleven families, and includes the gall-wasps and ichneumons.

2. *Tubulifera*—single trochanter and retrusible ovipositor, there are only three to five segments visible on the under surface of the abdomen.

This series contains only one family.

3. *Aculeata*—single trochanter and retrusible ovipositor, more than five segments visible on the under surface of the abdomen,

This series contains twelve families, and includes the ants, bees, and different kinds of wasps.

A short article on the production of potash in the United States appears in the *Chemical Trade Journal* of February 12. In 1915 steps were taken to produce potash salts on a commercial scale in the United States, and the plant of the Universal Products Corporation began to operate in October last at Marysvale, Utah, producing both potassium sulphate and alumina in high-grade form. The rated capacity of the works is from 25 to 30 tons of 95 per cent. potassium sulphate per day. The present plant handles about 150 tons of alunite daily, and plans are being made to double its capacity. At Searles Lake, California, the American Trona Corporation proceeded with the construction of its works to treat the potassium-bearing brine of that desert basin by the Grimwood process. At Trona (Searles Lake) only mixed salts are produced from the first part of the process, and these are refined at the port of San Pedro, California. The initial plants are expected to produce 100 tons of potash and 30 tons of borax daily. The alunite deposits of the Florence Mining and Milling Company at Marysvale, Utah, is to be exploited by a newly-formed corporation, the Utah Potash Syndicate. Some plants were erected elsewhere to utilise the potash of the felspars, but did not get into operation on a commercial scale.—*Nature.*

The Planters' Chronicle.

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(Secretary's Registered Telegraphic Address "Planting," Bangalore.)

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THE U. P. A. S. I.

(INCORPORATED.)

Contents.

Both the Deputy Director of Agriculture and the Director of the Labour Department are away on tour.

We publish the minutes of the Fifty-first Annual General Meeting of the South Mysore Planters' Association. We would call attention to the President's remarks on the Planters' War Fund and the Benevolent Fund.

We publish a portion of the Chairman's speech at the Ordinary General Meeting of the Rubber Growers Association which will be found most interesting and instructive; and will we trust be the means of inducing all Companies and Proprietors in Southern India to join the R. G. A.

Commencing with an amusing quotation we print the first portion of Mr. Brainbrigge Fletcher's article on Termites or White Ants.

We publish two letters from the Front, and would make an appeal to the generosity of any Tea Planters to respond to Mr. Barton's request for a "little drinkable tea."

We publish Mr. Cook's very interesting letter on Rainfall Statistics and would welcome similar information from various Estates and Districts.

SOUTH INDIAN PLANTERS' WAR FUND.

	Rs.	A.	P.
Amount previously subscribed	43,519	3	0
Mr. H. L. Pinches	40	0	0
Mr. C. Fraser	40	0	0
Mr. Percy Hunt	30	0	0
Mr. Stanley Sinclair	100	0	0
Mr. D. Elkington	150	0	0
Mr. D. V. Crowe	7	8	0
Mr. R. A. Calicut	25	0	0
Total Rs...	43,911	11	0

OVERSEAS AIR CRAFT FUND.

To Balance	90	0	0

DISTRICT PLANTERS' ASSOCIATIONS.

South Mysore Planters' Association.

Minutes of the 31st Annual General Meeting held at the Sakleshpur Travellers' Bungalow, on the 26th March, 1916.

PRESENT.—Messrs. M. J. Woodbridge (President), C. Lake (Vice-President), T. Anderson, F. M. Hamilton, C. J. Hayward, E. V. Hunt, St. J. Hunt, G. W. Gowans, E. W. Rutherford, W. F. Scholfield, A. Thomson (Honorary Secretary). *Visitor.*—A. L. Hill.

President in the Chair.

Before opening this meeting, if I express our deep regret for the sad accident which caused the death of Mr. H. G. Bonner, I think I am speaking for all present here to-day.

Mr. Bonner was not a member of this Association, but as a member of North Mysore has worked for the good of our community in many capacities and was well known in this district, and a personal friend of many of us.

On behalf of this Association, I wish to express our sympathy with his relations and the North Mysore Planters' Association on the loss they have sustained by the death of one of their oldest and most valued members. —Carried all standing.

Minutes of the last meeting were adopted.

PRESIDENT'S ADDRESS.

The past season has been a bad one generally throughout this district. The second bad season we have had in succession and our difficulties have been added to by the scarcity of shipping and high freights.

Prospects for the next year are so far good but everything depends on good rains next month.

The Labour Department has now been working for a year and is doing useful work although it has been unfortunate in the loss of two members of the staff; and I think we can look forward to its being able to assist us more and more as things settle down and the staff gain in experience. The Labour Rules that have been adopted by the three Mysore Associations during the past year are a step in the right direction, and I would call the attention of members to the copies of rules which have been sent round for signature in case there are any here who have not yet signed and returned them.

Everything in the nature of co-operation in purchase of manure has had to remain shelved during the continuation of the War. There has been a fair amount of work done during the year in matters of local interest such as Postal arrangements and roads and Medical Officers, &c.

The Railway policy of the Mysore Government has been a disappointment to us, who believe that the great need of the Malnaad is direct rail communication with the West Coast at Mangalore.

The Scheme for the development of the United Planters' Associations Scientific Department is making progress and I have heard that a start will be made almost at once in selecting and working Experimental Stations, one of which will probably be in Mysore.

With regard to the Mysore Assistant Scientific Officer, Mr. Frattini's agreement terminates in a year and the continuation of the present arrangement will have to come up for discussion during the year. A great deal of experimental work has been done during the year and some good results obtained. I regret that Mr. Frattini is still absent on sick leave and therefore unable to be here to-day and tell us something of the work that has been done.

I would call attention to the Planters' War Fund which will require all the support we can give it, and would also suggest that the Benevolent Fund is not receiving all the support from us that it deserves.

I thank you for the honour you have done me in making me your President for the last year and also thank the executive for the assistance they have given me and place my resignation in your hands.

The Honorary Secretary's report was then read.

Planters' War Fund.—The President again recommended this fund and pointed out that all subscriptions would be wanted.

Roads and Communications.—There was a short discussion on this subject and the slight improvement noted.

European Medical Officer for the Planting Districts of Mysore. —" Notice to be sent to the N.M.P.A. and B.P.A. asking their opinion on, and support to, a scheme to appoint a European Doctor resident at Chickmagalur for the benefit of the Europeans in the three Districts.

Proposed by Mr. Woodbridge and seconded by Mr. Rutherford:— That Mrs. Shank be elected a member of this Association " Carried.

Election of Executive.—The following were elected.

President	...	Mr. Lake.
Vice President	...	Mr. Hayward.
Honorary Secretary	...	Mr. St. John Hunt.

The Meeting closed with a vote of thanks to the outgoing President.

Federated Malay States.

According to telegraphic informatioa received by the Malay States Information Agency, the exports of rubber from the Federated Malay States for the month of February amounted to 5,207 tons, as compared with 3,411 tons in February, 1915, and 2,364 tons in 1914. This is the largest amount ever exported in any one month from the Federated Malay States.—*The Board of Trade Journal.*

Potash from Prickly Pears.

In certain parts of Queensland the Prickly Pear (Opuntia sp.) is a pest of cultivated land, and is being exterminated by means of spraying with arsenic trichloride. It is found that the ash of this plant contains 15 per cent. of potash, and that so much as seven tons per acre may be recovered. It is estimated (see *Chemical News*, 1915, 112, 81) that the value of the potash should pay the cost of freeing the land from this pest.—*The Gardeners' Chronicle.*

THE RUBBER GROWERS' ASSOCIATION.

(INCORPORATED).

Report of Proceedings.

At the Ordinary General Meeting held at the Cannon Street Hotel, London E.C., on Friday, the 18th day of February, 1916.

MR. E. L. HAMILTON, Chairman of the Association, presiding.

The Secretary (Mr. Frank G. Smith) having read the Notice convening the Meeting and the Auditor's report, the Chairman said :—

In moving the adoption of the Report, I think you will wish me to refer more in detail to the work of the Association during the past year. The Report deals briefly with the important business transacted, but it is impossible, even in the 40 pages which are taken, to embrace everything that has come before the Council during the year. One would have thought that the continuance of the war would have curtailed somewhat the activities of the Association, but a glance through the Report will, I think, reveal that your Council have made a good showing of their stewardship.

We have now been in existence as an association for eight years, and each year has spelt progress both in the history of the Association and also of the industry which we represent. Our membership has increased slightly during the year. It now stands at 662, comprising 412 Companies and 250 Individuals. We hope to increase this total during the ensuing year, as, with our new organisation, to which I will refer again later, we are now in a position to extend to our members benefits which hitherto they had not all enjoyed.

The Companies in our membership, as you will observe by the Report, represent an issued share capital of over £45,000,000.

The Capital value represented is much higher as many of the shares of Companies stand at a premium.

REORGANISATION.

You will perhaps remember that a year ago when we were assembled to hear Mr. McEwan's report on the work of the Association during 1914, he intimated that a revision in our articles was being planned, and would be submitted during the ensuing year for approval. The Special Committee which had the matter in hand under the able direction of Mr. Eric Miller spent a great deal of time with our lawyers in revising our Memorandum and Articles. We are indebted to Mr. Miller for many of the business-like alterations.

I had the pleasure of presiding at Extraordinary Meetings of the Association on the 24th November and 9th December, when the proposals submitted were unanimously carried. I indicated at these meetings that the prime reason for the alterations was to enable the Association to take over and work the two Research Funds, which hitherto had been separate organisations, although substantively carried on under the auspices of the Rubber Growers' Association. We felt that while we were about to make changes in our constitution, we should seize the opportunity of strengthening the position of the Association by absorbing these Funds.

The Research work has been carried on very efficiently in the past, and we are extremely grateful to the guarantors' Committee for their valuable services. The burden of contributing to research work fell only on those Companies and Individuals who were sufficiently interested in the

welfare of the Industry to support the Funds. Naturally, they considered that work of such value was worthy of wider support, and inasmuch as the benefits ultimately accrued to the Industry as a whole, they rightly considered that the cost should be equitably apportioned.

I am convinced that in continuing to carry on this research work as part of our organisation, we are conferring a great boon on the Industry in general. I am afraid that the value of research work has not been as much appreciated as it should be. We have heard that in Germany and America industries have been created in the laboratory, and that commercial men there realise the fact and consider scientific research as a necessary adjunct to their business. We can learn a lesson from this and leave no stone unturned which will enable plantation rubber to retain the premier position in the market.

The other alterations in our Memorandum and Articles were chiefly to facilitate the work of the Association in other directions and also to enable the Council more adequately to cope with the increasing importance of the Industry. We have also arranged for domestic matters to be attended to through the medium of Bye-Laws. With an Association which has attained to such importance as ours it is necessary that our internal administration should be regularised. We have endeavoured to frame our Bye-Laws so that members will have more opportunities of taking an interest in our affairs. For instance, the election of members of Council, which will be referred to later on, has been done by means of voting papers. This is an improvement on the old system and enables those members who are unable to attend our annual meeting to have a voice in this matter.

I may say that copies of our new Articles are available for any member of the Association on application at the Offices.

Local Committees.

You will have observed by the Report that we have formed Local Committees in Ceylon, Malaya and Southern India. This is another feature of our re-organisation and one which will be the means of bringing us closer into touch with our affairs in those countries. There are many local matters of importance arising from time to time and our representative Committees will look after our interests and keep us advised of what is going on. With regard to Malaya, we have joined with the Planters' Association and taken an office and appointed a local Secretary. This will add greatly to our Association's position in Malaya.

Excess Profits Duty.

Another subject calling for special comment is the "Excess Profits Duty" to be levied under the "Finance (No. 2) Act, 1915. This novel form of taxation has been the subject of anxious consideration by those interested in Rubber. Theoretically, the principle of taxing excess profits made during the period of the war would seem to be fair. When you apply the principle to Rubber Companies, the arbitrary method of calculating "Excess Profits" provided in the Act shows the inequity and injustice of the tax as applied to a large number of our Companies. The Rubber producing Industry does not wish to shirk its responsibilities and is quite prepared to submit to extra taxation to help to provide the necessary revenue to carry this terrible war to a successful conclusion (hear, hear). We all know what an enormous financial burden is being piled up every day, and it is only right those who are able to should pay more to the Government.

The effects of the Excess Profits Duty in regard to Rubber Companies is briefly that Companies in the intermediate stage of development are the principal ones affected, most of the other Companies escaping—at least at present.

If the Chancellor of the Exchequer had only had a more intimate acquaintance with Rubber Finance, I think he would have modified his Budget somewhat. At any rate, your Emergency Committee went into the matter very carefully and decided to ask the Chancellor of the Exchequer to receive a deputation.

At this deputation we produced various statements showing how the tax would affect different classes of Companies. The Chancellor was insistent in sticking to the principle of the Bill. So long as a Company, he said, showed in its accounts a larger profit, it was liable to Excess Profits Duty. His concluding remarks at the deputation are interesting. He said: "I am quite ready to realise that rubber is in an exceptional position and that these companies are developing companies and necessarily developing companies, and that the increase of profit they have made is not due to an increase in price and they are therefore in an exceptional position. I quite agree the 6 per cent. could not stand, but we have only to find out what is fair and reasonable.

During the debate on the Excess Profits Duty clauses in the Committee of the House, the Chancellor of the Exchequer referred to the position of Rubber Companies on more than one occasion, and judging by what he said, I think we can hope at the very least for an increase in the percentage standard—what that will be we must leave to our advisers.

We submitted to the Chancellor of the Exchequer in November last a suggestion "that there should be added to and allowed as part of the capital at the end of the last pre-war year, an amount equal to interest at 12 per cent. per annum on all capital expended by a Rubber Company during the years of non-production." This is following on a provision in the Companies' Act with reference to payment of interest out of capital during the development of a business.

Alternative methods of taxation have been submitted to the Association, the most popular one being that based on the price of rubber. An alternative to the proposals in the Finance Bill could not have been accepted as an amendment, if it in any way suggested taxation on Companies not within the scope of the "ways and means" resolution; therefore, as the alternative based on the price of rubber would have imposed taxation on all producing Companies, whereas the Excess Profits Duty only applied to certain classes of Companies, it would have been useless to have submitted it.

I believe the Chancellor has been inundated with various suggestions and schemes for assessing Rubber Companies, and if he has given them all careful consideration, his conscience must have smitten him if he realises he could have secured much more revenue out of rubber than by the way of "Excess Profits Duty." We do not know, however, what may be in store for us in the future in the war continues for much longer, therefore, we are taking up the question of succeeding Acts while going into the matter of the present Act.

We have retained experts to draw up a case for submission to the Board of Referees, and Companies have been asked to supply certain information. Those of you who have followed the debate on the Bill will have read that the Chancellor of the Exchequer on one occasion stated that Rubber Companies would have to go before the Board of Referees as a class or sub-classes of a trade and that an individual Company could not appear. Therefore it will be necessary for the Association to draw up their case on these lines and that is the reason for engaging Counsel and Chartered Accountants. We want to do the best for our members and our advisers will also have in mind the question of framing proposals for submission to the Chancellor when his next Budget comes out, which will not be so very long now.

With regard to the Board of Referees, we enlisted the good offices of the London Chamber of Commerce in making representations to the Treasury for someone with an expert knowledge of rubber growing to be appointed on the panel, so that he may advise the Committee when appeals are being heard. We felt that in view of the peculiar conditions attaching to cultivation and the necessity for the various factors to be constantly in the minds of those with whom decisions will lie, that the Board of Referees as at present constituted did not ensure that the special factors referred to would receive the consideration necessary to secure adequate protection for the Rubber Industry.

The Excess Profits Duty is not the only additional war burden placed on our Industry. Ceylon, you will observe, has imposed an additional Export Duty on rubber amounting to 10s. per 100 lbs. Then we have increased freight rates; the present time, however, is not one to grumble at extra freight charges; we ought to consider ourselves lucky to be able to ship our produce at all (hear, hear).

The shortage of freight is becoming more accentuated, and is accompanied by the risks of attacks by submarines, and these are factors which cannot be ignored.

Rubber Trade Association of London.

Your representatives on the Committee of the Rubber Trade Association of London have had a strenuous time during the past year. They attended not less than 33 meetings, and you can imagine how this must cut into their business hours, especially during these days, when our staffs are becoming more and more depleted owing to enlistments in the Army.

The Association held its annual meeting at our offices on the 2nd of this month, and the Chairman had some interesting things to say. The Association had dealt with a vast amount of work. The requirements of the Government called for many conferences and discussions. Trading with the Enemy questions had to be dealt with. New forms of contract had to be provided, including a new f. o. b. contract. Various sub-committees had attended the Government Offices, including the War Office, the Admiralty, the Home Office, and the Board of Trade, to say nothing of the Rubber and Tin Exports Committee. Important questions connected with insurance were also dealt with. The exigencies of the times necessitated certain emergency Rules being put into force, and also the amendment of other Rules.

(To be Continued.)

AGRICULTURE.

Termites or White Ants.

It is said that a well-known Encyclopaedia once defined a crab as "a little red fish which swims backwards," on which the obvious criticism is that a crab is not a fish, it does not swim backwards and that it is red only after it has been boiled. The popular nomenclature of insects often exhibits traces of a similar confusion of ideas: a "Black-beetle" for example, is not always black and never a beetle, and a "White-Ant" is not an ant at all and is not necessarily white. It is unfortunate that the term "White-Ant" should ever have been applied to these insects more correctly known as "Termites" but the term "White Ants" has taken too strong a hold on the popular imagination to be easily dispossessed.

Termites, to give them the correct name by which they will be referred to hereafter, have usually been classified amongst the Neuroptera, an order which includes very diverse groups of insects, such as Dragon flies, Ant-lions, and Lace-wing flies. Recent research has shown, however, that their affinities are rather with the Orthoptera and that they probably share with Cockroaches the honour of descent from a common primitive stock. It is certain that Termites and Cockroaches have many structural peculiarities in common, although to the ordinary observer no two insects appear more dissimilar; on the other hand, except for their social habits and caste-system (which is really only the principal of division of labour seen in nearly all animals practising a social existence) Termites have little in common with the true Ants, which belong to the order Hymenoptera (Ants, Bees and Wasps.)

In India we are only too well aware of the damage done by Termites to houses and Wooden buildings of all sorts and to household furniture. Working in concealment and being careful not to give any external sign of their attack, the mischief is often completed before any suspicion is aroused, and a beam or plank of wood, apparently substantial, is suddenly found to be nothing but a mere empty shell, the whole of whose interior has been eaten away by these tiny white insects which rapidly scuttle away into the obscurity of their galleries when the light is let in upon them. In some cases, when the material attacked is a beam supporting a weight, their operations seem directed by an intelligent appreciation of the stresses borne by the wood and portions are left to bear the strain or the interior is filled up with mud to replace the material removed. Some species, however, which normally live in decaying wood, seem to fill the interior with mud whether subject to stress or not, and perhaps they do this to keep the air moist in their galleries.

The damage done to crops is not so apparent to the casual observer as is that done to buildings, but the latter is really insignificant in comparison with the former. In many parts of India the normal damage to cereals is from one to two annas, rising to three or four annas or even more in bad years. Not only cereals are attacked but valuable crops such as sugarcane, poppy, groundnut, *khorasani*, fruit-trees, castor, jute, peas, sunflower, etc. The annual loss caused by Termites attacking crops in British India alone is estimated at over twenty million pounds sterling. The species which attack crops appear to be usually forms of *Microtermes*, but exact observations on this point are very desirable.

It would be too long a task to attempt to recite all the objects which are attacked and spoilt by Termites. All articles of organic origin (wood, paper, clothing, etc.,) are devoured, and even cases of tinned food have been known to be spoilt by Termites making their way into the wood of the case and bringing in wet mud, thereby rusting through the tins; some species are even known to be able to exude a fluid which is able to corrode glass. In other parts of the world the amount of damage wrought is only equalled by the celerity with which the Termites select an opportunity for attack; thus we read of a Surveyor who returned to Camp after a hard day's work and left his trunk on a table overnight:—"the next morning he found not only all his clothes destroyed by Termites, but his papers also, and the latter in such a manner that there was not a bit left of an inch square. The black lead of his pencils was consumed, the clothes were not entirely cut to pieces and carried away, but appeared as if moth-eaten, there being scarcely a piece as large as a shilling that was free from small holes; and it was further remarkable that some silver coin, which was in the trunk, had a number of black specks on it, caused by something so corrosive that they could not be rubbed off even with sand." Many other instances might be given, as of the Termites which "one night, in a few hours, pierced one foot of the table, and having in that manner ascended, carried their arch across it, and then down through the middle of the other foot, into the floor." Most residents in India, however, know by bitter experience how swiftly destruction may be wrought, even if their lot does not equal that of the prisoners in a certain Indian gaol who awoke one morning to find that their bedding had been eaten up whilst they were sleeping on it.

There is a large and rapidly increasing literature on the subject of termites generally, but it is a matter for regret that many inaccurate statements have been put forward with regard to the habits and economy of these insects. This has arisen very largely from the fact that a false analogy has been drawn between Termites and the True Ants on account of the social habits which they practise in common; but, although there are some general similarities in the economy of these two groups of these insects, the parallel cannot be pushed too far and made to include minute details. Other authors again have drawn similar analogies from a consideration of Termites alone, and from observations, on the habits of a few species have argued similar habits in others. It is very certain however that different species have widely different habits and that it is very unsafe to deduce the details of the life-history of one species from the knowledge of those of another. Every species must be studied and treated on its own merits. To the ordinary practical man a knowledge of minute details may seem to be of little use, and it may appear a matter of small moment whether one species does or does not build mounds or whether the individuals of its soldier-caste have a dozen or fifteen joints to their antennae; but if these seemingly trivial differences are found to be correlated with other differences, such as taste for particular kinds of food, they may prove to be of great practical importance.

It would naturally be expected that we should have a good knowledge of at least the different kinds of Termites which occur in the Indian Region, but it is a regrettable fact that this is by no means the case. Although India is the habitat of many species whose habits delight the observant naturalist and others which interest the systematic worker in the strangeness of their structure or the peculiarity of their geographical distribution, the Termites of India and Burma seem to have suffered a strange neglect at the hands of

collectors and observers of insects. A certain amount of work has been done, especially within the last few years, on the Sinhalese species, of which over thirty distinct forms are now known to science, whilst only about a score are known at present from the whole of the Indian Peninsula (including Burma) although it is probable that at least one hundred distinct forms really occur. I may add here that I shall be pleased to receive specimens from any part of India or Burma and will gladly send full instructions for collecting to any reader of this Journal.

To the Entomologist one of the most interesting species is *Archotermopsis wrough—toni*, which is said to occur commonly in Kashmir in old stumps of *Pinus excelsa*. It is a large species with a soldier nearly an inch in length and appears to be one of the few surviving members of a group of Termites which is chiefly known to us from fossil specimens which have been preserved in Baltic amber.

Another interesting group is composed of the members of the genus *Hodotermes*, in which the workers and soldiers are over half-an-inch in length and are remarkable in possessing well-defined eyes, these castes in Termites being without eyes as a rule. Although one species was described from India over 130 years ago, we still know very little of their habits. In spite of their large size and the ferocious appearance of their soldier-caste, they seem to do very little harm, confining their depredations to bits of grass and leaves which they cut into short lengths and carry down into their nests, from which they come out to forage in broad daylight.

A group which is of considerable practical importance is that which includes the genus *Leucotermes*, containing *L. indicola* and other species which are very destructive to timbers used for constructional purposes. Beams, rafters, furniture, clothes, books,-little comes amiss to these voracious insects, which apparently live in comparatively small colonies within the beams, etc., which they attack.

(To be Continued.)

CEYLON.

The following statistics of the exports of the exports of rubber of domestic production from Ceylon during the month of November, and the eleven months ended in November, 1914, and 1915, have been extracted from official returns issued by the Ceylon Government :—

To	Nov. 1914. lbs.	Nov. 1915. lbs.	Jan.-Nov. 1914. lbs.	Jan.-Nov. 1915. lbs.
United Kingdom ...	3,320,670	2,314,836	18,211,135	24,738,774
United States ...	172,669	3,270,051	7,967,426	17,924,711
Other Countries ...	87,344	194,834	4,503,308	2,302,447
Total exports of rubber of domestic production ...	3,580,683	5,779,721	30,681,869	44,965,932

—Board of Trade Journal.

CORRESPONDENCE.

S. I. P. War Fund.

1st Batt. R. War Regt.,
B. E. F.
Sunday, 12—3—1916.

THE SECRETARY,
U. P. A. S. I.,

Dear Sir,—Your letter dated November 9th 1915 and enclosures *re.* South Indian Planters' War Fund has only just reached me after much travelling about.

It is typical of the hospitality one always meets with amongst planters to start a fund for those of us who have been able to join the forces and are serving in different parts of the world. I have up to now met two South Indian Planters out here, one from the Anamalais who is doing despatch riding and the other Mr. Kinloch, also of this Regiment.

I joined this Regiment half way through the 2nd battle of Ypres which to put it mildly was a pretty warm beginning! We were in action again on the 24th May when the Germans made their 4th big gas attack but without success. We left that rather unpleasant area about the end of July, after having been there about 4 months and came south below Arras to take over part of the line from the French, where we have been ever since.

It is certainly very much quieter than Ypres and is looked upon as a "Rest" but we soon get disillusioned on this point as soon as the aerial torpedoes begin dropping and the Huns still have plenty of these in spite of their shortage of ammunition!! The whole Division has been out resting for nearly 6 weeks but I hear we are going back to the land of mud and water next week.

Apologising for writing you in pencil but ink is not obtainable.

Yours faithfully,
T. D. DIXON, 2nd Lieut.,
R. War Regiment.

S. I. P. B. War Fund.

Att. 2/6 Gurkha Rifles,
I. E. F. "D"
C/O Presidency Post Master,
Bombay,
28th March, 1916.

THE SECRETARY,
United Planters' Association of Southern India,
25, South Parade, Bangalore, S. India.

Dear Sir,—While in Egypt a letter from the Secretary of the Planters' Association was passed on to me asking planters who required anything to apply to you. Would it be asking too much of your kindness to send a little S. Indian tea, along to the Mess President of this regiment. We are issued a tea ration by the Government but it is not a very nice brand, and I have often heard officers complaining, so I thought that perhaps I may be able to raise a little drinkable tea from S. India, as I was planting there before the war. In case you find yourself able to do this, please try and arrange to send the tea by parcel post, otherwise it probably won't reach us safely,

I am dear Sir,
Yours truly,
R. M. S. BARTON, 2nd Lieut.

Ashamboo,
Travancore,
9th April, 1916.

Rainfall Statistics.

THE EDITOR,
Planters' Chronicle,
Bangalore.

Dear Sir,—The present drought is my excuse for writing. On going over the rainfall figures, which are on record here since 1872, I find it is the worst in this district for the 44 years—taking the dry season for 4 months 1st December to 31st March. The figures also show the worst droughts have run in almost decades. The years being 1876, 1895, 1906 and 1916. The year 1886 rather spoils the series as nearly 5 inches fell in that season's December. This season's rainfall for the same months is 2·32 inches of which more than half is made up by such very light showers as to be of no use.

As it may interest some members to compare figures, I enclose a memo of rain here since 1872 also the monthly averages for the 44 years.

Elevation is 2,300 feet and about 20 miles from the sea.

Yours faithfully,
JOHN B. COOK.

RAINFALL IN ASHAMBOO, SOUTH TRAVANCORE, ELEVATION 2,300 FEET. 20 MILES FROM SEA.

Year.	Rain.	Year.	Rain.	Year.	Rain.	Year.	Rain.
1872	96·82	1883	143·41	1894	83·39	1905	109·55
3	108·39	4	94·39	5	94·52	6	115·20
4	136·20	5	137·10	6	142·60	7	130·35
5	87·87	6	120·61	7	135·20	8	98·30
6	86·25	7	109·68	8	147·20	9	130·68
7	174·60	8	131·03	9	107·80	10	115·72
8	134·47	9	148·30	1900	151·05	1	94·61
9	125·65	90	75·80	1	124·80	2	136·05
80	104·51	1	118·73	2	125·75	3	123·08
1	103·70	2	82·41	3	141·25	4	110·49
2	211·62	3	107·41	4	147·45	5	136·96

44 years monthly averages.

January	1·25	July	17·90
February	1·46	August	11·41
March	2·02	September	10·41
April	4·94	October	19·60
May	9·95	November	12·72
June	24·15	December	5·57

Annual average 121·38 inches.

The Planters' Chronicle.

RECOGNISED AS THE OFFICIAL ORGAN OF THE U. P. A. S. I., INCORPORATED.

(Secretary's Registered Telegraphic Address "Planting," Bangalore.)

VOL. XI. No. 17.] APRIL 22, 1916. [PRICE AS. 8.

THE U. P. A. S. I.

(INCORPORATED.)

Contents.

We publish the Proceedings of the Quarterly General Meeting of the Mundakayam Planters' Association : also the Proceedings of a Quarterly General Meeting of the Shevaroy Planters' Association.

"Green Bug" sends us some more "Odds and Ends."

We publish monthly Statistics No. II of the Rubber Trade Association of London.

We publish a continuation of Termites or White Ants and continue the very interesting speech of the Chairman of the Rubber Growers' Association.

The Honorary Secretary, Shevaroy Planters' Association writes as follows :—"I am informed by Mrs. Leeming that her son Mr. K. Leeming is now in the 8th Officer's Cadet Battalion training at Lichfield."

We have to congratulate Mr. A. L. Hill of the 90th Punjabis, who was coffee planting in South Mysore, on the award of the Military Cross. He had been invalided from Mesopotamia to Bangalore, where we have had the pleasure of seeing him, and he has just rejoined his depot.

These offices will be closed for the Easter Holidays from the 21st to 24th both days inclusive.

All the members of the U. P. A. will be glad to hear of the return of Mr. Bremner of the *Madras Mail* to India and to welcome him at the next Annual General Meeting.

We have to thank the Honorary Secretary of the Kadur and Hassan Motor Association for the minutes of their first General Meeting, which we hope to publish in next issue. The report arrived too late for this.

SOUTH INDIAN PLANTERS' WAR FUND.

	Rs.	A.	P.
Amount previously subscribed	43,911	11	0
Mr. H. Clifton Leslie	10	0	0
Mr. R. Lescher	25	0	0
Total Rs...	43,946	11	0

OVERSEAS AIR CRAFT FUND.

To Balance	90	0	0

DISTRICT PLANTERS' ASSOCIATIONS.

Mundakayam Planters' Association.

Proceedings of the Quarterly General Meeting held in Mundakayam Club on the 8th April, 1916.

PRESENT.—Messrs. Howson (Chairman), McPhearson, Danvers Davy, Harley, Kirk, Murphy, Pollock, Simons, Eyre, Fitchett, Hendry, and by proxy Messrs. Eric Hall and S. P. Eaton.

In the unavoidable absence through illness of Mr. S. P. Eaton, Mr. Murphy acted as Hon. Secretary.

The Minutes of the last meeting were passed after Mr. Danvers Davy had questioned the ruling of the last Chairman in refusing to accept a resolution from Mr. E. Vincent, notice of which had not been given. The Chairman, replying to Mr. Danvers Davy, said that he supported his predecessor's ruling as under Rule XI alterations to Rules cannot be made without notice.

Arrangements made in connection with the coming visit of H. E. the Governor of Madras were discussed.

The Popular Assembly.—The Acting Honorary Secretary read the following report from the Association's Delegate, Mr. S. P. Eaton.

Mr. Chairman and Gentlemen.

Mr. West was unavoidably prevented at the last Minute from attending the Sri Mulam Assembly as your Delegate and as there was no time to hold a Committee Meeting to appoint a substitute I went in his place.

I received your instructions from Mr. West to bring forward two subjects namely the Timber Values in the new Land Regulation and the Kodimatha Landing Stage. As regards the former I only heard a few days before going that the Dewan had already seen a deputation of Planters on the subject and certain suggestions of theirs had been discussed at considerable length. As the matter was thus Sub Judice I thought it better not to make any definite proposals or requests so I only spoke in a general way, pointing out that the new Regulation would put a stop to planting enterprise &c. The Dewan answered that he had discussed the matter with the Deputation previously mentioned and that it was having Government's careful consideration. He seemed to quite understand that the Regulation as it stood was an injustice to the Planting Community, and I am of opinion that if we and other Travancore Planters' Associations take a strong stand Government will agree to very greatly modify its present demands.

As regards the Kodimatha Landing Stage, I found on reaching Trivandrum that Mr. Milner, The Central Travancore Planters' Association Delegate was to speak on the same subject. I discussed the matter with him and we went together to see the Dewan and Mr. Bastow the Chief Engineer privately as well as bringing the subject forward very strongly at the Assembly with the result that Government agreed to finish the work before the coming Monsoon provided The Central Travancore Planters' Association and ourselves agreed to loan them the necessary money until the beginning ot Government's financial year in August. This I am glad to say both Planters' Associations agreed to do and I understand that the work is now being proceeded with.

A vote of thanks to Mr. Eaton was unanimously passed.

Tax on Tea.—It was resolved that the Hon'ble Mr. Barber be asked to take up our case as regards the double duty now being levied.

Timber Value on Planting Lands.—This matter was discussed at some length in Committee and the view was freely expressed that tke rates now fixed by Government would put a stop to all planting extensions. No resolution was proposed.

Kodimatha Landing Stage.—The Chairman said that of the Rs.8,000 advance asked for by Government Rs. 1,000 had been guaranteed by each of the following concerns:—Travancore Rubber Company, Central Travancore Rubber Company, Malayalam Tea and Rubber Company and Yendayar Estate; that Peermade had agreed to find the rest of the money and that work is now being proceeded with. A vote of thanks to the Durbar for having so readily met the Associations wishes was passed.

Date of Annual Meeting.—Mr. Danvers Davy said:—"I have no desire, Mr. Chairman and Gentlemen, to take up your time in a long winded dissertation as to the merits or otherwise of my resolution and trust that as good wine needs no bush this resolution will need no push. In the Rules of this Association brought out in November 1912 particular mention is made as to the date of the Annual General Meeting and why it was not included in the book of New Rules I do not pretend to understand. The first 14 or 15 days in January is to most of us a very strenuos period and to many of us a time that is entirely given up to office work over closing accounts. It is therefore impossible for these to be able to attend what is usually the most interesting Meeting in the year. Superintendents, Managers and others having their time so fully occupied cannot give attention to the often piteous appeals from the hardworking and long-suffering Honorary Secretary requesting one to send him at once facts and figures for his Blue Book and to enable the Chairman and Honorary Secretary to give as comprehensive a report on the past year's doings as possible. By holding the Annual General Meeting in February all this will be immediately done away with and everyone will be directly benefitted. I will now put my resolution before the Meeting:—"That the Annual General Meeting of this Association be held on a fixed date and that this date, the first Saturday of February, be fixed for the General Annual Meeting. I hope some member will second it."

The Resolution was seconded by Mr. Eyre, but an amendment proposed by Mr. Hendry and seconded by Mr. Hamond confirming the present arrangement of settling at each Meeting the date of the next Meeting was carried.

Travancore Combined Planters' Association.—The following resolution proposed by Mr. Murphy and seconded by Mr. Kirk was carried *nem con.* "That the Honorary Secretary to the Travancore Combined Planters' Association be asked to explain why an original resolution altering a rule was proposed and accepted at the Annual Meeting in February, 30 days notice of same not having been given as required by Rule 8 and 9." Mr. Eyre proposed:—"That having regard to the recent extraordinary Meeting of the Travancore Combined Planters' Association held notwithstanding Rule 5 at the request of apparently one Member only on very insufficient notice, The Travancore Combined Planters' Association be asked to hold no extraordinary Meeting in future without giving sufficient notice to permit of District Associations holding if necessary extraordinary General Meetings under their respective rules," Seconded by Mr. Hamond and carried unanimously.

Mr. Murphy Proposed:—"That notice be given at the next Meeting of the Travancore Combined Planters' Association our delegate shall propose.

1. That with the permission of the Council of the United Planters' Association of S. India this Association be called in future the UNITED PLANTERS' ASSOCIATION OF SOUTH INDIA, TRAVANCORE BRANCH, instead of the Travancore Combined Planters' Association.

2. That the United Planters' Association of S. India be asked to obtain a license from the Travancore Government similar to the one granted by the Government of Madras on the 22nd April, 1899.

3. That voting at Meetings of this Association shall be by the elected delegate of each Association carrying one vote for every 100 acres and that one vote be allowed to each subscribing Commercial Firm and to the Planting Member of the Legislative Conneil.

4. That the Annual Meeting of the Association be held at least one month before the date on which notice must be given to Government by District Associations on the subjects to be brought forward at the Popular Assembly.

5. That the Planting Member of the Travancore Legislative Council shall not be eligible for election as Chairman or Vice-Chairman of this Association."

and spoke briefly in support of it. With reference to 5, he explained that when, as at present, the Planting Member is also Chairman of the Association, the Executive Committee consists of only three instead of four Members.

The resolution was seconded by Mr. Kirk and carried unanimously.

Scientific Department.—The Honorary Secretary was instructed to write to the Scientific Department Committee with reference to the Experimental Station, for Rubber, the District selected by the Committee not being considered suitable.

Labour.—Mr. Harley explained a labour dispute he has had with a South Travancore Planter. It was resolved to send the Correspondence to the Honorary Secretary, South Travancore P. A. for consideration by his Association.

Date of Next Meeting.—Saturday 8th July.

A vote of thanks to the Chairman closed the proceedings.

(Signed) H. M. E. HOWSON,
Chairman.

Signed) S. P. EATON,
Honorary Secretary.

Shevaroy Planters' Association.

Proceedings of a Quarterly General Meeting of the Shevaroy Planters' Association, held at the Victoria Rooms, Yercaud, on Tuesday the 11th April, 1916.

PRESENT.—Revd. Father Capelle, Messrs. E. Travers Drapes, S. M. Hight, A. B. Kundaswamy, J. C. Large, C. G. Lechler, E. L. Poyser, C. Rahm, W. Rahm, and Ch. Dickins (Honorary Secretary).

(1.) *Notice calling the Meeting.*—The Notice calling the meeting was taken as read.

(2.) *S. P. A. Membership.*—Mr. E. Travers Drapes was unanimously elected a member of this Association.

(3.) *S. P. A. Committee.*—Messrs. E. Travers Drapes, and W. Rahm were elected to serve on the Committee in the place of Messrs. G. Turner and K. Leeming, who have left the country.

(4.) *Re. Lantana on the Shevaroys.*—Read and Recorded letter No. 196 1916 dated 25th February from the Planting Expert on the subject.

(5.) *Coffee Stealing Case.*—Read and Recorded letter No. 105 dated 6th March 1916 from the Collector and Dictrict Magistrate-Salem.

(6.) *Jutka Service between Suramongalam and the Foot of the Hills.*—Read and Recorded letter No. 296 dated 7th March from the Post Master-General, Madras, informing the Association that a Jutka Service has been started to convey the Mails between Suramongalam Railway Station and the Foot of the Hills.

(7.) *Special Preventative Police Arrangements during Crop time.*—Read Proceedings of the Sub-Committee appointed by the S. P. A. of their meetings of the 3rd and 7th March with reference to the measures considered necessary for the prevention of Coffee Stealing.

(*a.*) *Resolved.*—That resolutions 1, 5, 6, be adopted and that the Honorary Secretary be requested to submit a copy of the same together with a Report to the Government of Madras through the Collector and District Magistrate-Salem, with a request to lend his kind support, and that a copy of the same shall also be sent to the Planting Member.

(*b.*) *Resolved.*—That this Association approves of the proposed scheme for the Special Preventative Police Force and that a copy of this Resolution be forwarded to the D. S. P. with the thanks of the S. P. A. for the keen interest he has taken in this matter.

(Signed) CH. DICKINS.

Honorary Secretary, S. P. A.

ODDS AND ENDS.

By "Green Bug."

The Department of Commerce and Industry of the Government of India have issued the following Customs Circular (II of 1916.)

The Government of India have decided to exempt tea waste from payment of the export duty of Rs.1—8—0 per 100 lbs. leviable on tea exported from British India, and the Collectors of Customs have been instructed accordingly.

The Karachi Chamber of Commerce has passed a resolution calling for a conference of all the Chambers of Commerce in India to consider what action should be taken after the war with regard to German and other trade. It is suggested that the Conference might be held either at Simla or Bombay.

The consumption of tea in India is on the increase as is shown first of all by the increase in the number of native buyers which was a noticeable feature of the past season's trading in Calcutta; and secondly by the Fact that though the shipments of Dust Tea to Hankow are less than they were two years ago very little fluctuation has taken place in the price of this class of Tea and there has been a steady demand for it.

The Consular Report for the year 1914 of the District of Bordeaux —(France) shows that in normal times her Coffee is imported almost entirely from Brazil and Venezuela. 7,474 metric tons were imported in 1912, 6.703 in 1913, and 4,695 in 1914. Of this 1,238 metric tons were exported in 1912 to French Colonies and Spain, 1,613 tons in 1913, and 350 tons in 1914. Ground-nuts were imported to the amount of 86,358 metric tons in 1914 from French Colonies. Rubber was obtained from French Colonies, Germany, Brazil, and the United States and in gradually diminishing quantities from the United Kingdom. While 1,412 metric tons were obtained from the latter in 1912 only 805 tons were obtained in 1914. The Province of Saigon (France) imports 99% of its Tea from China, the total imports in 1914 being 975 metric tons and in 1913 2,074 metric tons.

On 10th April H. E. Lord Pentland, the Governor of Madras began a tour in the Planting Districts of Travancore. He is accompanied by the Hon'ble Mr. E. F. Barber, the Planting Member of Council and the tour will be watched with the greatest of interest by all planters. It is to be hoped that one of the many benefits which may accrue from it will be a settlement of the difficulties which have arisen with regard to levying of the new duty on Tea. The Travancore planters are placed in the unfair position of having to pay this duty twice over once when the Tea leaves Travancore State and again when it leaves British India.

RUBBER TRADE ASSOCIATION OF LONDON.

MONTHLY STATISTICS,

No. 11.

IMPORTS of all kinds of Rubber into the United Kingdom.

From	February. 1916.	1915.	1914.*	Two Months ended Feb. 1916.	1915.	1914.*
Straits Settlements and Federated Malay States ...	1,946	3,096	2,313	5,605	7,637	4,889
Ceylon ...	703	1,578	813	1,792	3,444	1,424
British India ...	56	155	—	292	371	—
Dutch East Indies ...	197	140	—	453	423	—
Brazil and Peru ...	1,186	1,040	1,849	2,112	1,346	3,113
Africa ...	448	73	67	780	492	91
Other Countries ...	56	133	1,413	156	228	2,936
Total Tons ...	4,592	6,215	6,455	11,190	13,941	12,453

EXPORTS of all kinds of Rubber from the United Kingdom.

To	February. 1916.	1915.	1914.	Two Months ended Feb. 1916.	1915.	1914.*
Russia ...	458	522	563	683	851	1,273
Germany ...	—	—	836	—	—	1,662
Belgium ...	—	—	237	—	—	532
France ...	846	544	561	1,533	851	1,152
United States ...	2,530	3,328	1,428	4,706	3,670	3,016
Other Countries ...	595	571	361	1,345	1,482	736
Total Tons...	4,429	4,965	3,986	8,267	6,854	8,371

*Including Waste and Reclaimed Rubber.

IMPORTS, DELIVERIES AND STOCKS in London and Liverpool, February, 1916.

		Imports. For Feb.	Deliveries, For Feb.	Stocks 29th Feb. 1916.	1915.	1914.
London	Plantation ...	4,156	4,219	7,279	7,175	4,257
	Other kinds ...	107	55	230	674	549
	Total Tons...	4,263	4,274	7,509	7,849	4,806
Liverpool	Para ...	874	781	500	768	1,003
	Other kinds ...	286	261	283	323	1,103
	Total Tons...	1,160	1,042	783	1,091	2,106
Total Tons for London and Liverpool ...		5,423	5,316	8,292	8,940	6,912

Shipments from Straits Settlements and F. M. S.

	January.		
	1916.	1915.	1914.
Tons ...	8,914	6,049	3,723

Shipments from Ceylon.

To	January, 1916.	January. 1915.	1914.	1913.
United Kingdom ...	689			
Russia ...	8			
Germany ...	—			
Belgium ...	—			
France	—			
U. S. A.	1,469	1,166	1,120	682
Other Countries	10			
Total Tons	2,176			

U. S. A. Imports and Exports.

	November.			Eleven Months ended Nov.		
Imports	1915.	1914.	1913.	1915.	1914.	1913.
India rubber ..	8,603	5,470	4,363	88,032	58,703	47.048
Gutta and Balata ...	795	288	270	12,358	9,786	18,640
Total Tons...	9,398	5,758	4,633	100,390	68,489	65,688
Exports.						
India rubber ...	209	504	121	2,009	2,334	1,797
Gutta and Balata ...	2	28	36	395	196	115
Total Tons...	211	532	157	2,404	2,530	1,912

Para Receipts.

	Feb., 1916.	July, 1915/Jan., 1916.	Total.
Rubber ...	3,940	17,270	21,210
Caucho ...	860	2,790	3,650

	Feb., 1915.	July, 1914/Jan., 1915.	Total.
Rubber ...	4,835	15,813	20,648
Caucho ...	870	2,042	2,912

6, Mincing Lane, E. C.,
9th March, 1916.

AGRICULTURE.

Termites or White Ants.

(*Continued.*)

Within the limits of a short article, it is impossible to do more than mention a few species in particular. *Coptotermes* forms a group known as "Latex Termites" from the drop of sticky milky fluid exuded by the soldiers to repel attacks of enemies; *C. gestroi*, described from Burma, has achieved notoriety by its attacks on Rubber trees in the Malay Peninsula, and Professor Watase informs me that this same species is a very serious pest in Japan where it causes great damage to wooden structures of all kinds. *Eutermes* has in many species two distinct forms of the soldier-caste, a larger and a smaller, but both agree in having the front of the head prolonged into a long tubular beak. In E. *biformis* the large form of soldier ejects through this beak to a distance of two or three inches a very fine jet of sticky secretion which hardens immediately it comes in contact with the air and forms a fine viscous thread. In a nest of this species which I opened up at Parantij there was a small accumulation of short lengths of grass-stems, and this species apparently does not feed on wood. In Ceylon an allied form (E. monoceros) makes its nest inside hollows of trees and issues out at sunset in a long regular procession to gather lichens from off neighbouring tree-trunks. Considering that these insects are totally blind, the regularity of their line of march is truly wonderful. The workers march along in a solid stream, 8 or 10 abreast, whilst the soldiers take up their position on either of the route, facing outwards ready to repel attack. The size of one of these armies is best realised by considering the fact that it takes about five hours to pass a given point at the rate of one metre in a minute and, and as one metre of the procession may contain between 800 and 1,900 Termites, simple calculation shows that a single army of foragers may amount to a quarter of a million individuals or even double this number. Arrived at the tree previously fixed on by the soldier-scouts sent out ahead of the main body, the workers proceed to scrape off the lichen with their jaws, and in this work an admirable plan of division of labour is adopted. Had each worker to hold in its mouth the lichen already collected, the movements of its jaws in scraping off a further supply would be seriously embarassed. The whole army is, therefore, divided into squads of six or seven individuals, one of which holds in his jaws the fragments of lichen scraped off by his fellows, who are thus enabled to gather a large supply in a comparatively short time. Towards dawn the army prepares to return to the nest in reverse order to that in which it started, the soldiers continuing to line the route and forming up as a rear-guard after the workers have passed. Such regularity in the order of the procession, such division of labour and such mutual help would doubtless be ascribed to intelligence if carried out by animals higher in the scale of nature, and our admiration must be increased still more on reflecting that these tiny insects are totally blind.

It is members of the typical group *Termes* that are most familiar to the ordinary observer as it is the activities of these species which are usually the cause of the well-known "White Ants' Nests" or mounds. Probably we have a large number of different kinds in India, but it is not

every form which makes a mound. Some pass a life of concealment underground and are rarely seen except when the winged forms swarm out at the beginning of the rains; in the others, the position of the nest is clearly marked by a mound which may vary from one or more insignificant-looking heaps of hearth a few inches high to a single conical pinnacle towering up to fifteen feet or more. In comparison with a really tall Termites' nest, the "sky-scraper" of our modern cities sinks into insignificance; basing comparison on the relative lengths of a Termite and a human workman, the Termites's structure would only be overtopped by a building nearly a mile in height.

In the following remarks we will confine our attention to the group of common mound-building species which are best known to the ordinary observer.

To understand something of the internal economy of a nest it is necessary first of all to glance briefly at the constitution of the individuals which compose it; these consist of (1) workers, (ii) soldiers, both of which castes are made up of sexually immature males and females and (iii) of sexually mature males and females. Besides the foregoing there are of course immature individuals of each of these principal castes. All start from an egg, but it is not known whether all the eggs laid by a single female are similar; in the case of the honey-bee it is a well known fact that only eggs fertilized by the male element give rise to females, and that the queen, when laying eggs in drone-cells, has the power to withhold the issue of spermatozoa from the spermatheca in which these are stored; there is, however, no evidence that this is the case amongst Termites, and it is probable that the Termite eggs are all extruded in an undifferentiated and fertilized condition, although this does not necessarily imply that the sex of the contained embryo has not already been determined. It is supposed that the ultimate destiny of each individual egg (*i.e.*, whether it is to develop into a worker, soldier, or sexual form) is determined by differences in the food given to the newly-hatched individual, but it appears that this view is based on analogy with what occurs in the case of bees rather than on actual observations; in the case of eggs which hatch in a large nest there may undoubtedly be a possibility of many different variations in food and feeding of the young individual but it is difficult to see that there can be much choice of either in the case of the first batch of eggs raised by a solitary pair on the foundation of a new colony; yet we know from our own experiments that such a first batch of young does contain individuals differentiated into workers and soldiers. As the newly-hatched young differ from the helpless grubs of bees in being able to walk about as soon as they emerge from the egg, it is also difficult to see how they can be restricted to one particular form of diet. Be this as it may, it certainly appears to be the case that Termites can, in some cases at least, exercise a certain amount of control over the ultimate destiny of immature individuals, and can sometimes change into one form an individual which is already far advanced towards development into another caste. If the transformed individual does not attain satisfactorily to the standard of its type, it is probably killed and eaten—*pour encourager les autres* a cynic might say, but the real reason is that an individual intermediate between two different forms would be incapable of performing completely the work of either, and the Termite community does not tolerate inefficiency in its members.—*The Agricultural Journal of India.*

(*To be Continued.*)

THE RUBBER GROWERS' ASSOCIATION.

(INCORPORATED).

Report of Proceedings.

(*Continued.*)

Your representatives, therefore, had a very busy year and credit is due for their services rendered in the interests of the Rubber Growers' Association. Very few matters had to be referred to the Council, and the relations existing between the two Associations have been of the most cordial nature (hear, hear).

We have kept you fully advised from time to time of the decisions arrived at.

RUBBER AND THE WAR.

The demands of the war on rubber are enormous, and a study of the various uses to which rubber is put should appeal to all interested in our commodity. There is hardly a detail in war equipment in which it does not figure. Huge quantities of tyres are being produced. Then there are millions of water-proof ground sheet which are used universally, in fact, a ground sheet forms part of every soldier's equipment. In the manufacture of dynamite, the workmen have to wear rubber boots, gloves, coats, etc., and as it is estimated that there are about 140,000 men engaged in the manufacture of dynamite, you can imagine that in this connection alone, there is a considerable quantity of rubber used.

In the hospitals we find rubber appears in every way in attending to the suffering of humanity. It is comforting to us to think that our product is doing such useful service in the shape of hot water bottles, icebags, air cushions, etc., etc.

In the trenches we have rubber boots, a perfect godsend where water, slush, and mud have to be encountered. With regard to rubber boots, I think a little credit is due to our Association in getting rubber boots provided for the troops. We tried very hard to get them introduced soon after the war broke out, but the matter was shelved until the first winter had passed. Then the War Office woke up and after a great deal of perseverance on our part, the Authorities decided to provide rubber trench boots for our soldiers. The manufacturers were of considerable assistance in preparing samples for approval. I do not know whether the Authorities are afraid that there will not be enough rubber to go round, but this necessary kind of footwear is not issued to those branches of the service behind the firing line. One of the members of our Council, Mr. Malcolm Cumming, who had been for some time at the front, came into personal contact with the conditions prevailing and took the matter in hand when he returned to England. Mr. Cumming inaugurated a Fund for providing Knee Boots and the Council voted a sum of £150 for the purpose. A further £800 was collected in the Council Room at one of our meetings and certain Companies and Individuals subscribed later. A number of boots have been sent out where we are sure they will be much appreciated.

NEW USES FOR RUBBER.

The war has directed our attention to extending the use of rubber. Having succeeded in getting rubber boots adopted we endeavoured to induce the War Office to put rubber tyres on artillery, and heavy wagons, and offered to provide the rubber for a test. Then we offered the Admiralty a quantity of rubber for the purpose of testing its capacity to lessen the shock of a torpedo with a view to having certain vessels covered with rubber. Both these suggestions fell through.

Rubber has come into prominence lately in its application to life-saving devices. No doubt you will have read that when the s.s. *Persia* was torpedoed, one of the passengers who was saved, stated that he owed his life to an inflated rubber waistcoat which he was wearing when the ship went down.

When the war is over, we shall have to devote our energies in the direction of new uses in order to cope with the increasing output. We have great hopes in the future of rubber roadways. A small section having been experimented on some time ago, the Company which has been formed is proceeding with the manufacture of blocks for a large length of roadway, but the war has delayed the matter somewhat, as manufacturers, like ourselves, are suffering from a shortage of staff. Labour is scarce now and practically all manufacturers have to bow down to the wishes of the Government and execute their orders first.

Germany and Rubber.

You have no doubt read of the great straits to which our enemies are put owing to the cutting off of their supplies of crude rubber, and the frantic endeavours which are being made to obtain the commodity.

All sorts of devices are resorted to, and this fact proves how efficient are the steps which have been and are being taken to prevent Germany or her Allies from obtaining the commodity.

In the early days of war, Germany managed to get a fairly large supply of rubber, until the Government, largely at the instance of the Association, declared rubber contraband. Then Germany had to resort to secreting the commodity in cargoes of other produce. Our Navy proved too vigilant for this to last long, so having failed to smuggle the article in this way, they showed not a little ingenuity in devising other means of getting rubber.

A German woman was arrested in New York recently as she was about to leave for Europe, and the Authorities discovered she had 3,500 lbs. of rubber in her trunks and packing cases which were declared to contain personal belongings! Again we read of attempts to smuggle rubber into Germany through the post, also in the shape of cunningly devised and innocent looking sausages, onions, even trees with the branches made of rubber. One of the latest dodges is in the shape of an underskirt made of crepe rubber (laughter).

All these attempts show how extreme must be the needs of Germany at the present time. Their manufacturers are unable to produce many articles from crude rubber, so they have to make goods in "war qualities," like the "war bread"; these qualities contain no crude rubber but only reclaimed and substitute stock, mixed with the necessary fillers and vulcanising ingredients.

Our old friend the synthetic bogey has, it appears, found a material as well as a spiritual home in Germany. The German Chancellor stated in one of his speeches before the Reichstag that they were using synthetic rubber in lieu of the natural product.

According to a report from America, the present price of rubber in Germany is about 50s. a lb., and at such figure synthetic rubber can be profitably produced.

The German Colonial Association, however, has laid emphasis on the future need of the Fatherland of establishing rubber plantations. They are not satisfied with laboratory creations. We shall take good care that no German encroaches on our preserves in the Middle East (hear, hear).

(To be Continued.)

The Planters' Chronicle.

RECOGNISED AS THE OFFICIAL ORGAN OF THE U. P. A. S. I., INCORPORATED.

(Secretary's Registered Telegraphic Address "Planting," Bangalore.)

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THE U. P. A. S. I.

(INCORPORATED.)

Contents.

The Deputy Director of Agriculture, Planting Districts has returned from his tour in the Anamalais.

Thanks to the courtesy of Messrs. T. H. Allan & Co. who are furnishing many of the figures, the Deputy Director of Agriculture, Planting Districts hopes to be able to make his article on Markets, Prices and Statistics a regular weekly feature of the *Chronicle*.

We publish the proceedings of the first Annual General Meeting of the Kadur and Hassan Motor Association. This is the first account we have received of such an Association in any Planting District and do not even know if such other exists; but we cannot too highly commend it. The united force of opinion must tend to the better preservation and up-keep of roads for motoring.

The Proceedings of a largely attended General Meeting of the Nilgiri Planters' Association are published.

The interesting article on Termites is concluded in this weeks issue.

SOUTH INDIAN PLANTERS' WAR FUND.

	Rs.	A.	P.
Amount previously subscribed	43,946	11	0
Messrs. Barber & Pascoe	75	0	0
Mr. R. H. Crowther	10	0	0
Mr. J. S. Wilkie	30	0	0
Mr. K. H. Lysons	40	0	0
Mr. W. H. G. Leahy	20	0	0
Mr. W. A. J. Milner	20	0	0
Mr. J. S. Wilkie	30	0	0
Mrs. David Elkington	30	0	0
"Anon"	27	1	0
Total Rs...	44,228	12	0

OVERSEAS AIR CRAFT FUND.

To Balance	90	0	0

DISTRICT PLANTERS' ASSOCIATIONS.

Kadur and Hassan Motor Association.

Minutes of the 1st Annual General Meeting of this Association, held at Chickmaglur Travellers' Bungalow, at 2 p.m., on the 15th March, 1916.

PRESENT.—Messrs. K. Krishna Iyer, H. Watson, F. I. Morgan, H. G. Bower, R. G. Foster, W. E. Scholfield, F. Hugonin, C. Lake, C. J. Hayward, St. J. Hunt, D. Meppen, A. Thomson (Honorary Secretary).

Mr. Krishna Iyer was elected to the Chair.

Resolved "That this meeting wishes to place on record its deep sense of loss sustained by the whole Mysore Community through the sad death of Mr. H. G. Bonner and desires the Honorary Secretary to communicate the sympathy of this Association to his relatives.

The minutes of the last meeting were read, and after some discussion the following resolutions were put.

"That at General Meetings not less than 5 members form a quorum." Proposed by Mr. Lake seconded by Mr. Watson.—Carried.

The resolution of the last meeting with reference to the badges be held in abeyance until the next meeting. Meantime members be requested by circular to suggest new designs. Proposed by Mr. Lake seconded by Mr. Bower.—Carried.

The remaining minutes were passed.

Correspondence.—The Honorary Secretary was requested to write to the Hassan Deputy Commissioner pointing out that as he was willing to take notice of individual complaints this Association fails to understand his attitude with regard to joint complaints made through this Association.

Resolved to approach Insurance Companys as to what rebate they are willing to allow on cars and motor cycles insured through this Association.

Roads.—To write to the Deputy Commissioner Kadur District with regard to the danger to traffic caused by the two water tables situated about a mile from Mudigere on the Mudigere—Chickmagalur road, also the dangerous position of a guard rail on the Bassanhully Tank at the town end, and the appaling state of the Chickanhullie—Gondebede road.

To write to the Hassan Executive Engineer drawing his attention to the bad state of the Thollolpet—Chickanhullie road and to the unconsolidated metal on the Belur—Chickmagalur road Mile 22 Furlong 4-5.

Accounts.—These were passed and the Honorary Secretary was instructed to collect outstandings.

Resolved that this meeting wishes to place on record its sense of gratitude to Mr. Krishna Iyer the Deputy Commissioner of the Kadur District for his very active interest in all matters affecting the affairs of this Association.

Election of Committee.—The following were elected. Messrs. F. I. Morgan, C. Lake, H. Watson, K. Krishna Iyer, A. Thomson (Honorary Secretary).

(Signed) A. THOMSON,
Honorary Secretary,

Nilgiri Planters' Association.

At a General Meeting of the Nilgiri Planters' Association, held on Wednesday the 12th April, 1916.

PRESENT.—Messrs. J. S. Nicolls (Chairman), Gerrard Rogers (Honorary Secretary), Robert Stanes, James Stanes, W. Cherry, A. S. Dandison, P. Beaver, B. A. Marden, W. S. Rowson, E. S. Clarke, Leslie Rogers, A. N. C. Groves, D. Bisett, K. West, C. L. Eagan, A. K. W. Downing, T. J. Kenna, Thomas Brown, W. C. Deane, J. Harding-Pascoe and W. Moir. *Visitors* :—Messrs. E. Gerrard and I. James, D. S. P., R. D. Richmond, D. F. O., and Major W. Ward.

Late Messrs. Charles Gray and E. F. H. Day.

Before the proceedings on the agenda were taken up, the Chairman referred to the death of the late Mr. Charles Gray and Mr. E. F. H. Day in the following terms :—

"Gentlemen,—It is with the deepest regret I record the deaths of Mr. Charles Gray and Mr. E. H. F. Day. Mr. Gray was one of the oldest residents of Coonoor and for many years a member of this Association, in which he always took the keenest interest, a sound planter and ever ready to assist his brethren. As a botanist his opinion was of the greatest value.

It was only at our last meeting here that I introduced to the members then present Mr. E. H. F. Day, Deputy Director of the Labour Department of the U. P. A. S. I. Those amongst you who are members of the Department will have appreciated the thoroughness and keenness he thrust into his work to straighten your labour difficulties in Coimbatore. The U. P. A. S. I. have lost a clever and capable officer ; an irreparable loss.

In the deceased the Planting nation has lost patriots and many of us friends of our youth, leaving gaps that cannot be filled.

I will now ask you to authorise your Honorary Secretary to write to Mrs. Gray and Mrs. Day expressing feelings of our deepest sympathy in their great loss, and to the Director of the Labour Department of the U. P. A. S. I. sympathy in the loss he and its members have sustained by the death of Mr. Day."

The above was carried, all present standing.

Proceedings of the Last Meeting.—Before confirming the proceedings of the last meeting, the Chairman pointed out that the resolution under the Pest Act should read as follows : the word "not" having been inadvertently omitted in the published proceedings :—

"Resolved that this Association is prepared to accept the Pest Act proposed by Government and hopes that Government will specially guard against diseases or pests by *not* making Forest Lands nurseries or sanctuaries for said pests."

U. P. A. S. I. CIRCULARS.

Scientific Department.—The following circulars from the Secretary of the United Planters' Association were read :—

"At a Committee Meeting of the Scientific Department held at Ootacamund on February 29th, it was resolved :—

1. "That this Committee in consultation with the Scientific Officer has selected the following for the first three Experimental Stations.

1. Tea. Peermade.

1. Rubber. Palapilly District.

1. Coffee. Coorg and Mysore Boundary, and would be obliged to Honorary Secretaries if they will confirm the selection. Any objection to be made before the 31st March. 1916. The remaining three Experimental Stations will be selected later on."—Read and recorded.

II. "Resolved that in the event of the proposed sites being approved, of, Mr. Anstead should be asked to go and visit, select and demarcate the selected areas, in conjunction with the Associations of the Districts concerned."—Read and recorded.

Scientific Department to assist the Planting Industries.—The following order from the Acting Secretary to Government is circulated for your iniormation.

"Order. The correspondence read relates to a scheme for the development and retention on a permanent basis of a Scientific Department to assist the Planting industries of Southern India. The scheme formulated by the Director of Agriculture, and supported by the Board of Revenue contains the following proposals :—

(*a*) The establishment at the outset of four experimental stations in typical planting areas, one for coffee in the Coorg-Mysore frontier, one for tea in Peermade in Travancore and two for rubber. One in South Travancore and the other in Cochin or South Malabar. The United Planters' Association of Southern India are prepared to place at the disposal of Government twenty acres of standing crop at each station. The arrangement is to remain in force for a period of fifteen years. The land will be provided without initial cost and free of rent.

(*b*) The addition to the cadre of the Indian Agricultural Service of a post of mycologist for the investigation of diseases affecting rubber, coffee and tea in Southern India.

(*c*) The permanent retention of the re-organised scientific branch with the existing expert and the proposed mycologist under the control of the Madras Agricultural Department.

2. The initial and immediate recurring charges involved in the scheme amount to Rs. 21,600 and Rs. 39,450 per annum respectively. The United Planters' Association of Southern India have guaranteed an annual subscription of Rs. 10,000 for a period of five years, in lieu of their present contribution of Rs. 4,036. The Mysore Durbar have agreed to pay for the same period a contribution of Rs. 1,000 per annum on account of the mycologist.

3. The Government approve the details of the scheme, subject to the sanction of the Secretary of State and to the acceptance by the United Planters' Association of Southern India on the following conditions :—

1. The Government reserve to themselves the right to postpone the introduction of the scheme until receipt of the first year's contribution of Rs. 10,000 from the Association.

2. That the land required for the experimental stations shall be given free of initial cost and that it shall be free of rent as long as the station exist and not only for the period of 15 years and

3. That at the close of the five years for which the Association's subscription is guaranteed, the Government shall have the right to alter the rate of contribution as they may deem fit and to withdraw the services of the two officers wholly or in part in the event of non-acceptance of the altered rate."

These letters were recorded and approved by the meeting.

Estates Employing Modern Machinery.—With reference to the proposal of Government to tax profits from tea manufactured by machinery in factories on the Nilgiris, considerable discussion took place. Mr. Nicolls said he had already taken legal advice and was petitioning Government against his assessment, and asked the association if it was necessary to take the matters further whether the association would contribute to his expenses in a test case. It was pointed out that as the Act now stood planters were clearly not liable, as tea leaf in its raw state was not a marketable commodity. Legal opinion also had been taken in the matter and individual members were advised that they could not be taxed as the Act now stood. Mr. Clarke wished to know if this tax was being levied in connection with the war, and was answered from the chair in effect that he thought it was not in any way connected with the war. Mr. Harding Pascoe pointed out that it would carry greater weight if the matter was represented through the United Planters' Association, through which body a stronger representation could be sent up to Government. It was also pointed out that the Nilgiris was the only District so far that was being assessed and that at present representations would not reach the U. P. A. S. I. from other districts. Mr. Pascoe pointed out that it would be useless to make a representation in effect that the Act did not permit such taxation for it was open to Government to amend the act and levy the tax.

After considerable discussion the following resolution proposed by Mr. Harding Pascoe and seconded by Mr. Dandison, was carried unanimously :—

" Resolved that the U. P. A. S. I., be requested to make a strong protest to Government against the proposed tax on profits from tea manufactured by machinery in factories, such a tax being a direct bounty to foreign grown teas.

That the idea of taxing the investment of capital in manufacturing machinery and power without which articles to meet the competition of producing countries outside the Empire cannot be made, is likely to retard the much to be desired development of the nation's resources of India."

It was also thought that any individual member might carry his case directly to Government. Mr. Pascoe in this connection remarked that he hoped that any member doing so would send such a representation up to Government in his own name and not through a legal adviser, for if the matter went to the Government through a firm of solicitors, Government would at once pass the matter to their solicitors and the result would be that there would be two legal opinions, one against the other, with each legal adviser trying to see which was the better man. The final result would be that the matter would not go forward rapidly. Mr. Nicolls said he would withdraw his appeal to the Association for a contribution after what Mr. Pascoe had said, but as he did not follow Mr. Pascoe's contention, he would go on with his cases, if necessary.

Export Duty on Tea.—In this connection it was pointed out that India would be seriously handicapped if a similar duty was not being imposed by foreign countries. After some discussion the meeting approved

with satisfaction of the action taken by the India Tea Association in this connection. Indian Tea Association Circular of 15-3-1916 *re.* the Export Duty on Tea.—Read and Recorded.

Forest Reserves—In regard to the resolution passed at the last meeting of the Association it was resolved that replies received from planters in this connection should be sent to the Planting Member as early as possible. The Honorary Secretary intimated that this would be done during the week.

Planters' Labour Act.—With reference to the amendment of section 35 of the Labour Act the following letter from the Collector was read :—

" Sir,—I have the honour to invite your attention to the correspondence regarding the amendment of the Madras Planters' Labour Act, which took place in the year 1907 (vide G. O. No. 367 Judl, dated 28th February 1908) and to inform you that Government have now under consideration the question of amending section 35 of the Act. Government feel that it is necessary that the section should be amended either by excluding maistries from its operation or by giving the Magistrate discretion in the matter of making an order to complete performance. The Government would prefer to exclude Maistries from the operation of section 35, as the remedies provided by section 24, including, as they do, a power to fine up to Rs. 500 and to give the planter compensation out of the fine, appear to be sufficient. The Government are, however, willing to accept as a compromise the amendment of section 35 by substituting the word " may" for " shall" occurring in lines 3 and 4 of the section.

2. I request that you will be good enough to place these proposals before the Association and to communicate to the opinion of the Association at an early date."

Mr. Nicolls made the following remarks.

I know there are planters who are waiting to hear what I have to say on the proposed amendment. I was a strong supporter of the Act and am still so, and welcomed the introduction of the Act into the planting district of Wynaad and the Nilgiris It was aiming at giving me what I wanted— " Protection to ourselves as well as to the Labourer and Contractor." I did not think the Act a perfect one and knew, as time went on, wise and just amendments would be made. A point we all want is specific performance and the only way the Act gives us this is through the section Government now propose to amend, or to cut out of the Act.

" Penalty for default by a maistry," Section 24 of the act. Government suggest that the planter may obtain compensation by being paid a certain proportion of any fine levied. If a defaulting maistry was in a position to pay a fine over and above that which would recompense the planter, I do not think he would default. The maistry who defaults with the intention of doing so would rejoice at the deletion of section 35. His position would be the same as it was under Act XIII.

Why should Government wish to amend section 35. Has this section been any way abused. I say no. Can the Government or have they given us any reason for this amendment. No. Some years back we suggested some amendments to Government, and I think Government informed us we had made no case out for amendment. The reply from us now to Government should be the same—" That no case has been made out for its amendment." We ask Government to protect us against deliberate fraud on the part of the contractor and to give us, as far as possible, specific performance."

The contractor who defaults from no fault of his own would not be dealt with harshly by any planter and he can always prove his case under the Act. The Wynaad Association passed a strong resolution at their meeting of the 22nd ultimo. I would suggest that a similar resolution be made by this Association. I hope members present to-day will go thoroughly into this matter and give the meeting their opinions.

The Honorary Secretary pointed out that the Collectors of the Nilgiris and Malabar had always reported well on the working of the Act in their annual reports, and had not referred to any abuse of Section 35.

After some discussion it was resolved that this Association should adopt the following resolution carried at the Wynaad Association, namely:—

"This Association considers that section 35 is a vital one, and that no case has been made out for its amendment. It considers that it is a decided deterrent to deliberate fraudulent breach of contract and that it has not been misused. Carried unanimously.

Committee.—Mr. Bisset was elected a member of the Committee in place of Mr. Harding Pascoe, who had resigned.

With a vote of thanks to the chair and Collector for the use of the room the meeting terminated.

(Signed) J. S. NICOLLS,
Chairman.

(„) L. A. GERRARD ROGERS,
Honorary Secretary.

The *Pioneer Mail* of February 5th, contains an interesting account of the presidential address delivered by Dr. H. H. Hayden to the Mining and Geological Institute of India, which dealt particularly with problems raised by the war. As Director of the Geological Survey of India, Dr. Hayden spoke with the authority of an expert, and his description of the German metal ring and its vast ramifications was peculiarly instructive. He explained that for years past Germany had been gradually acquiring control, not only of metals, but also of the raw materials for their production. Her activities embraced Europe. America, Australia and India. In Australia, for example, the Zinc Corporation had contracted to sell to her all their concentrates until the year 1919; Germany took the entire wolfram output of Burma, and the monazite sands of Travancore were being worked by German firms, the production of thorium nitrate being so regulated that the gas-mantle industry was completely controlled. Dr. Hayden then turned to India's opportunities of developing her own resources. The wolfram output of Burma is being expanded; The tungsten industry has been taken out of German hands, and a new British industry has been established. Dr. Hayden suggests that it would pay to make ferro-tungsten on the spot if the electrical method could be economically introduced into Tavoz. Dr. Fermor has shown that the manufacture of ferro-manganese may be regarded as a sound commercial proposition. If, then, India can arrange for the partially finished product to be exported instead of the ores, the tungsten and manganese industries should be assured of that permanence which is so desirable. Dr. Hayden also touched on the question of the manufacture of coal-tar dyes and the glass industry, especially in the matter of the supply of glass bangles, which latter he regards very hopefully.—*Nature.*

MARKETS, PRICES, AND STATISTICS.

COFFEE.

Brazil receipts to 19th March.

1916.	1915.	1914.	1913.
13,350,000	10,815,000	12,292,000	10,322,000

It looks as if the total of the present crop, including Bahia, would be 14½ millions. Estimates for 1916—17 range from 12½ to 13½ millions.

Offerings in auction have been.—

	15—21 March	Total since 1st Jany.	Last year to 24th March.
East India (new crop) ...	Nil.	Nil.	3,581
Costa Rica ...	3,826	29,748	30,854
Other Milds ...	2,148	41,338	49,927
Brazil ...	3,260	14,319	45,000
Robusta ...	61	309	9,331
East Africa and Uganda ...	315	5,615	2,675

PRICES.

	No. 1.	No. 2.	No. 3.	PB.	T.
Nairobi—					
Chania Farm ...	7. 75/6	7. 67/6	3. 61/6	1. 89/-	9. 58/-
Chania ...	17. 76/6	8. 68/6	4. 62/-	2. 83/6	11. 58/6
Njirimori ...	12. 79/-	5. 68/-	3. 63/6	1. 83/-	6. 58/6
Deepdene ...	6. 78/-	6. 68/6	2. 62/-	—	5. 58/-
Deepdene ...	—	5. 69/6	18. 63/-	—	2. 55/-
K. ...	8. 78/6	5. 70/-	2. 63/-	—	7. 59/6
Anmer ...	38. 79/6	15. 70/-	5. 64/6	2. 86	14. 60/6
Mysore—					
Kerkie Coondah ...	23. N	16. N	5. 66/-	8. N	4. 65/6
Handi ...	44. N	48. N	13. 69/-	8. N	9. 67/-
Coorg—					
Hunchi Betta ...	20. 81/-	22. 74/6	1. 65/-	5. 83/-	11. 69/-
WWF. E. ...	30. N	25. 75/6	—	5. 83/-	14. 69/-

Auctions have shown a fair demand at firm prices. It was reported a few days ago that, in order to release tonnage for the carriage of more necessary articles, the French Government had decided to prohibit imports of Coffee from Brazil from 1st April (Bill of Lading date) to 31st October, and from all other countries from 1st May to 30th November. So far nothing has been decided, but it is now said that only Brazil coffee will be stopped. It has also been rumoured that our own Government will limit the imports of coffee not suitable for home consumption.

Such measures would probably push up prices in England and in France while depressing them in America.

The first arrivals of East Indian coffee (ex "Berbera") came up for sale on 23rd March. It was generally expected that they would go off well, but the coffee was not very attractive and buyers evidently made up their minds to wait until they had further arrivals to choose from, with the result that bidding was very slow and only a small part sold. Comparatively the Coorgs looked better than the Mysores, but they have a very large proportion of Triage.

Rubber.

The market has been very quiet. There are no South Indian sales to report. Crepe 3/6. Smoked Sheet 3/5½.

Tea.

Tea has again met with good enquiry at hardening price especially grades up to about 11d., but there were no sales of South Indian tea in the week ending 21st March.

	1916. lbs.	1915. lbs.	1914. lbs.
Imports for the month of February—			
Of Indian	10,858,050	16,352,422	11,337,997
„ Ceylon	4,522,981	7,793,290	7,465,914
„ China	727,514	1,395,183	758,207
„ Java, etc.	3,716,099	1,872,384	3,800,586
Total...	19,824,644	27,413,279	23,362,704
Home Consumption for the month of February—			
Of Indian	29,465,355	20,456,424	14,896,398
„ Ceylon	9,169,071	6,896,709	6,786,874
„ China	1,156,786	1,315,249	1,105,214
„ Java, etc.	3,489,968	1,545,243	2,013,714
Total...	43,281,1	30,213,625	24,801,700
Exports for the month of February—			
Of Indian	2,073,944	2,138,606	1,385,857
„ Ceylon	1,746,044	1,222,821	1,681,622
„ China	1,508,011	1,088,633	793,282
„ Java, etc	168,742	106,699	188,659
Total...	5,496,741	4,556,759	4,049,420
Total Deliveries (Home Consumption and Exports) for the month of February—			
Of Indian	31,539,299	22,595,030	16,282,255
„ Ceylon	10,915,115	8,119,528	8,467,996
„ China	2,664,797	2,403,882	1,898,496
„ Java, etc.	3,658,710	1,651,942	2,202,373
Total...	48,777,921	34,770,382	28,851,120

Pepper & Cardamoms.

Pepper quiet, fair Tellicherry 9d. Cardamoms no change.

R. D. A.

THE RUBBER GROWERS' ASSOCIATION.

(INCORPORATED).

Report of Proceedings.

(*Continued.*)

STATISTICS OF THE PLANTATION INDUSTRY.

To those who make a study of statistics, the following particulars will, I think, be of interest.

It is estimated that about 70 millions sterling of British Capital is invested in the Plantation Industry this figure representing the Issued Share and Debenture Capital, with the Premium on Shares and Reserves put back into the Estates.

The total area under rubber is approximately 1½ million acres, Malaya leading with 670,000 acres, Ceylon 224,000 acres; the Netherland Indies 517,000 acres; Southern India and other countries 90 to 100,000 acres. Approximately 80 per cent. of the total is British (hear, hear.)

These, gentlemen, are eloquent figures of the Plantation Industry, an Industry which has been so largely financed by British Capital, and fostered by British enterprise. It is one of the important assets of the Empire and has played no small part in strengthening our position in the war (hear, hear). There is no reason why the British Empire should ever relinquish the premier position in this Industry which has helped to revolutionise land transport throughout the world.

The world's production of rubber for 1915 is estimated at 146,000 tons, of which about 98,000 tons are plantation. For 1916, the estimated production of Plantation Rubber is between 130,000 and 135,000 tons. A comparison with the plantation production of previous years shows the rapid development of the industry. The total for 1914 was 71,380 tons, that for 1910 8,200, while in 1905 there were only 145 tons produced on plantations.

With regard to the consumption of all kinds of rubber in 1915, America leads the way with upwards of 90,000 tons, an increase of 30,000 tons over 1914.

According to the Board of Trade figures Great Britain retained 15,000 tons for home use, against 18,500 for 1914. It is also interesting to note the increase in consumption by our Allies, Russia and France. Russia's demand was 16,000 tons for 1915, against 11,000 tons in the previous year, while France increased her consumption over 1914 by 2,000 tons. All these figures are approximate.

Those who have to deal with the marketing of our produce will probably have noticed the growing tendency for direct shipments from the East to America.

Shipments from Malaya to America increased from 5,700 tons in 1914 to 23,000 tons in 1915. With regard to Ceylon, there were 4,096 tons shipped direct to America, as against 8,209 tons in 1915,

There are various factors which have accounted for this, chiefly the saving in time and cost of direct shipments against transit *via* United Kingdom. The war, no doubt, is to some extent responsible both directly and indirectly for absorbing the huge production of rubber available.

America at the present time is experiencing a state of great prosperity which is, in a measure, also due to the war. It is said that the quantity of rubber required in 1916 by the United States alone for its automobile tyres will amount to 75,000 tons, practically half the world's production last year. Nearly 2½ million cars were in use in the United States during 1915, and a further million and a quarter are to be put on the road in 1916.

Future of the Industry.

As to the future of the Rubber Industry, I am afraid I must be excused from prophesying.

The Rubber Industry takes a high place in the world's commerce, and we must aim at making the Plantation Industry take the premier position.

Co-operation is necessary to achieve success, and so long as we keep together and work with the ultimate object of benefitting the Industry, that success is assured. We have common interests at stake, and our Association has been of infinite service in bringing us together to discuss many matters of policy and principle.

The Industry is still, comparatively speaking, a young one, and therefore there is much for us to do. There is one thing to be said, I do not think we could have kept pace with the rapid strides made during the past years unless we had had the Rubber Growers' Association to represent the Plantation Industry. (Applause).

Properties and Utilization of Sesame Seed.

Sesanum indicum, the til or gingeli of British India, has at least two easily recognised forms in this country-one with white seeds (safed til), the other with (kala til). The latter is the most abundant and is reputed to yield a superior oil. The method of manufacture is by expression in mills. The oil is clear and limpid, varying in color from pale yellow to dark amber. In India this product is largely used for culinary purposes, in anointing the body, in soap manufacture and as a lamp oil. It also frequently employed as an adulterant of ghee, a form of native butter. As it resembles olive oil in many of its properties, it is accordingly similarly utilised. When exported to England it is chiefly used there for making soap.

The oil from the black variety of sesame is generally stated to be more suitable for medicinal purposes than the white. It is also extensively employed in the manufacture of Indian perfumes, and for this purpose the perfume is frequently extracted by the seeds direct-layers of the seeds being placed between layers of flowers, etc. Thus a favorite jasmine extract in India is made by layers of sesame seed wetted in water being placed alternately with layers of jasmine flowers, all being covered with a cloth and left for 12 to 18 hours, after which an oil is obtained that has all the scent of the flower.

The white-seeded form of sesame is largely eaten as an article of food, more especially in certain sweetmeats. The oil cake left after expression of the oil is even eaten as food by the poorer classes. In Madras tanghedi bark is sometimes added to the seed before being pressed for oil.—*Spice Mill.*

AGRICULTURE.

Termites or White Ants.

(Continued.)

Numerically the most important individuals in the Termite community are the "workers." Apart from reproduction and defence these carry out practically all the duties required of members of a social body; they take charge of the young, excavate, build up and repair the nest, forage for food outside of the nest, and (in many species) attend to the cultivation of the fungus-gardens. Irrespective of age, there are often two forms, a larger and a smaller, whose functions do not appear to be greatly differentiated, though as a rule the larger forms seem to act as foragers, whilst the smaller individuals attend to the internal economy of the nest. The jaws in the workers are well adapted for cutting through fibrous substances such as wood, and it is the workers alone which damage crops and woodwork.

Amongst the social bees and wasps each worker is armed with a powerful sting which as a rule is used solely for defensive purposes. In the case of Termites, however, in all the more highly developed species the defence of the nest is provided for by a special caste called "Soldiers," which are entirely distinct from the workers structurally and whose business it is to keep order amongst the workers and to repel any assaults upon the nest or foraging-parties. The soldiers have no sting, it is true, but are armed with large-peculiarly-modified and often formidable-looking jaws and have also (in many species) the power of discharging a sticky substance which binds and disables their ordinary enemies and particularly ants. To us their bites seem insignificant, their jaws barely piercing the skin and the sticky exudation doing no more harm than to leave a reddish-brown stain which persists for a few days. We do not seem to have in India any species so ferocious as are those in Western Africa; Smeathman relates of the soldiers of one of these that "if they get hold of anyone, they will in an instant let out blood enough to weigh against their whole body; and if it is the leg they wound, you will see the stain upon the stocking extending an inch in width." Possibly it was these same soldiers of which another traveller in West Africa gives the following quaint account:—"I one day attempted to knock off the top of one of them (Termites' nests) with my cane, but the stroke had no other effect than to bring some thousands of the animals out of doors, to see what was the matter, upon which I took to my heels and ran away as fast as I could."

The role of the soldiers appears to be solely to act as defenders of the nest, and in doing this they appear to realise the soundness of the military maxim that the best defence is a vigorous offence. In many species the opening of the nest sees the immediate retreat of all the workers out of sight, while at the same time it gives the signal to the soldiers to swarm out and repel the disturber of the peace. Blind as they are, they seem obsessed with rage and run about with jaws open and ready to seize the foe. On meeting the intruding or any strange object, it is seized firmly in the mandibles sometimes with such determination that the soldier will allow itself to be torn in two rather than relax its grip, whilst the sticky exudation is poured out copiously from the gland in the head. If no enemy can be found, the soldiers gradually retreat into the nest, whilst the workers bring up earth and repair the breach, but the soldiers continue to line the exposed galleries with their heads directed outward ready to meet any further assault.

Except by acting as escort to foraging parties, the soldiers seem to take no part in procuring food for the community, and the extreme modification of their mouthpart appears to prohibit them from feeding on hard substances such as wood. It seems probable that they are nourished principally on liquid food discharged from the mouth or the rectum of the workers. In addition to this, they may perhaps fill the role of undertakers and find part of their sustenance in the bodies of their comrades, either those which may have died in the nest or those marked out for execution as being unsatisfactory in their development.

In some species (More especially in *Eutermes*) there are two or more forms of the soldier-caste, characterized by distinct differences in size and in the shape of the head. In this respect there is a close parallel with many species of true ants.

The individuals which are destined to mature true sexual characters are distinguishable in early life by their larger size and by the possession of small pads which will later on develop into wings. These nymphs with wing pads may be found in some nests at almost any season of the year but are most common in the spring at the beginning of the dry hot weather; at this time batches of twenty or thirty at a time may often be found in small chambers within the nest; they do not seem to be provided with fungus-comb as a rule, and it seems probable that they do not eat fungus, but are fed in a special manner, either by food predigested and disgorged by the workers or perhaps on the "red bodies" which will be noticed later on. Just before the rains begin, these nymphs attain the perfect state and, on the occurrence of the first heavy shower, issue out of the nest in the swarms which are such a feature of this period of the year. Comparatively very few escape the numerous enemies which prey on them the moment they emerge from the nest. Ants, lizards and ground-feeding birds catch them before they have time to take to flight, and even in the air birds and bats and dragonflies pursue them relentlessly: even man himself does not disdain the dainty fare, which is said to taste like sugared cream and almond paste.

Aitken's account of the emergency of a swarm is at once accurate and amusing:—"As each young adventurer drew itself through the narrow gateway, arrayed like a bride in its long gauze wings, it bade a tearful farewell to the friends of its childhood, and, rising upon the breeze, started upon the voyage of life. I do not know what rosy hopes were at that moment blushing on the horizon of its young life, but a king-crow shot from his station and wiped them all out with one loud snap of its beak. In half a minute a second rose on its feathery wings and sailed away towards the sky, until a swallow-shrike seemed to glide over it, and it disappeared. No beak snapped this time. The bird just swept past with open mouth, and the ant was not.....Thus, one after another, each in happy ignorance of the fate of its predecessors, they went forth to seek their fortunes, and the fortunes of all were the same. I doubt if a single one came to a happy end." A few however do survive, and shortly after the swarm has emerged a few individuals may usually be seen resting on grass-stalks, etc., head-downwards, with the abdomen raised and tremulous and the wings quivering; at this time they emit a heavy sweet, honey-like odour which is doubtless attractive to the opposite sex. As soon as the mate has been attracted—and often before this—the wings are shed, being thrown off voluntarily by a jerking motion, whereupon each wing breaks off along a natural transverse future near its base, leaving a small stump attached to the thorax. Two or

more individuals are often seen running rapidly along the ground in single file at this time in search of a suitable crack or hole in the soil in which to commence a new nest. It has been denied by some observers that these winged individuals are capable of founding a new colony by themselves; that they can do so in the case of *Termes ceylonicus* we have been able to prove at Pusa in the summer of 1911, when a pair of winged individuals which had swarmed out of a nest on 25th June was kept in confinement and successfully laid eggs by 9th July and reared fully-developed workers and soldiers within three months, when the experiment was unfortunately terminated by mischance. In 1910 also winged individuals were collected from a swarm on 23rd June and by 29th June had laid eggs which hatched on 18th July. The parents did not stir from the small cell which they had constructed and did not appear to feed at all; probably on first emergence from the nest they contain enough nutriment to meet their own needs and those of their young until these latter are sufficiently developed to go out foraging. Some observers have stated that the reproductive organs of these winged individuals are immature at the time of swarming and that they are not developed until a considerable time afterwards; the dates of opposition given above appear to disprove this in the case of *Termes ceylonicus* and, furthermore, in digging up next day the ground whence a swarm of this species had emerged on 24th June 1911, a pair was found coupled, though unfortunately they were dead; one individual had shed its wings, the other still retained them.

The few pairs which are sufficiently fortunate to find a suitable site usually in some small crack or cranny in the ground, commence the foundation of a new nest by preparing a small rounded chamber just large enough to contain them both. This they do by excavating the earth with their mouths and carrying it outside. The female then settles down to the more serious business of laying eggs, to which her whole existence is henceforth to be devoted. As the nest grows the body of the female swells until the brown chitinous plates which at first formed her back become merely little islands widely separated by an expanse of white skin, and ultimately she develops into a monstrous unwieldy grublike animal, incapable of walking, a mere pulsating mass of eggs. How long it takes for the female to assume this monstrous shape we cannot say, but it is probably not less than two years; certainly three months after emergence from the nest the female shows no perceptible sign of enlargement, although by this time she has laid eggs and reared up young. The total length of life of a female is quite unknown, but (barring accidents, of course) it is probably not less than five years and may perhaps extend to ten or more years.

The rate at which the female lays eggs was stated by Smeathman to be sixty in each minute and this statement has been widely copied and repeated by subsequent authors. A female of *Termes sp.*, taken from a mound at Hoshangabad and placed under as natural conditions as possible, was found to have laid 359 eggs in fifteen minutes, a rate of opposition which works out roughly at 34,000 in one day. When the female has attained these enlarged dimensions, she is indeed nothing but a vast reservoir of eggs, and their extrusion appears to be purely an involuntary action.

The growth of a mound-nest is apparently very slow at first, and it is probably not until after the first anniversary of its foundation that it becomes noticeable above ground. By this time its population has become very numerous and extension proceeds more rapidly. In some cases it appears that the building of a mound above ground-level is due largely to the neces-

sity for disposal of the earth excavated below ground in extending the cavity which contains the nest, and that the pinnacles of the mound form a kind of scaffolding around the mouths of the galleries up which the excavated material is brought. In other cases, however, in which the pinnacles are left open, they seem to act as ventilating shafts. The particular shape of the mound varies considerably and is usually characteristic in each species of Termite.

In localities in which the ground is liable to become water logged during the rainy season, it is probable that the mound is also used more largely as a residential quarter than at drier seasons of the year when the population of the nest is found deeper down. From my own observations, I am led to believe that, in some cases at all events, the royal cell and nurseries for the young are moved up into the mound above ground-level during the rainy months and are shifted again below ground-level after the rains are over. I have definite proof that a new royal cell may be built and the queen moved a considerable distance into it.

On opening up a mound-nest, the first objects met with, at two or three inches below the surface, are often small chambers one or two inches in diameter and which contain small rounded masses of coarsely granular comb. These chambers are not made by the mound-builder, but belong to a small kind of *Microtermes*. On continuing the opening of the mound, we come upon series of larger chambers filled with a yellowish-brown spongy "comb" full of workers and soldiers of the mound-builder. These chambers communicate with one another by small galleries and usually increase in size towards the bottom of the nest. The larger and lower chambers are filled with very large masses of comb which swarm with small white immature Termites: these larger combs are what we call "nursery" combs and are characterised by their large size and the presence of newly-hatched Termites and of masses of eggs.

Nymphs (*i.e.*, immature winged individuals) are sometimes found in the comb, but more usually in small chambers without comb and situated in the upper part of the nest. With the nymphs, and sometimes in the nursery-comb near the eggs, or even intermingled with these, are found masses of the small spherical orange-red objects which we have called "red-bodies." The origin and use of these remain unknown. They are not of vegetable origin, and I have ventured to suppose that they may be a special food-reserve, or royal food for the nymphs, prepared from partially-digested and regurgitated animal matter. The royal cell is generally found near the nursery chambers, its vicinity being indicated by the royal body-guard of soldiers which are to be seen in large numbers when progress of excavation approaches the queen's cell. This is surrounded by small galleries, large enough tn admitt the passage of the soldiers and workers attendant on the founders of the nest, but too small for these latter to pass. The cell is about four or five inches long by two or three broad, with a flat floor and an arched roof, and contains the male and female. Occasionally two or more queens are found in one cell, but there never seems to be more than a single male.

The comb which fills these chambers is generally in the form of rounded masses, slightly concave on the lower surface, the exterior more or less corrugated and the interior filled with an intricate maze of intercommunicating passages. It is composed of very finely comminuted fragments of wood and other vegetable substances, from which the Termites have extracted all matter assimilable by process of digestion. The figures give a better idea of the general appearance of a comb than any verbal description.

Scattered over the surfaces of the combs will be seen small white stalked globules which represent the immature stages of a fungus which is cultivated and eaten by the Termites, and indeed the whole mass of comb seems to be built up expressly for the purpose of growing this fungus, upon the cultivation of which the well-being of the nest seems to depend to a large extent. In occupied nests these fungi are bitten off and eaten whilst still small enough to form a mouthful for the Termites, but in deserted nests the fungi grow until they appear above-ground as small white mushrooms, whilst the resting-stage (*Sclerotium*) which remains in the deserted chambers of the nest forms a hardened blackish object which at first sight would seem to have no connection with the small fungus grown on the comb. The fungus commonly found is *Xylaria nigripes*.

One of the most interesting subjects in connection with Termites' nests concerns the various other animals which live associated with the Termites. Numerous small beetles and flies are found, especially in the nursery-combs, where they frequently prey upon the eggs and young of their hosts, by whom they are tolerated, or we might even say domesticated, on account of their exudation of some liquid agreeable to the Termites. It is impossible to attempt to give here a list of these "termitophilous" insects, but amongst the most curious are the strange-looking wingless flies of the genus *Termitoxenia* of which there are at least three species in India. —*The Agricultural Journal of India.*

CAPTAIN J. A. GRAHAM.

The following extract from the *Times* of March 27th has been sent to us by a Correspondent. On April 1st, we referred to his death and to all his old friends the appreciation of him by his two Commanding Officers will be very welcome.

Captain John Arthur Graham, 7th Lincoln Regiment, killed on March 20th in France in his 40th year, was the youngest son of the late Brigade Surgeon, H. W. Graham, Bengal Army. He was educated at the United Service College, Westward Ho! and at Heidelberg, Germany. He served as a trooper in Lumsden's Horse in the South African campaign and was mentioned three times in dispatches. He was awarded the Distinguished Conduct Medal and the South African Medal with three clasps. He held a commission in the Coorg and Mysore Rifles and received the long service medal. In March 1915, he came to England and was gazetted a lieutenant in the 7th Lincolnshire Regiment in July last. He was then attached as bombing officer to the 51st Brigade. He was mentioned in dispatches of January 1st, 1916, and was awarded the Military Cross on January 15th. The General Commanding the 17th Division writes of him:—"A braver or more gallant soldier never died for England and many hundreds of thousands have died during this war." His Brigader writes:—"No braver or more valiant gentleman ever served Great Britain. I feel his loss deeply myself, He was ever foremost; his example was a grand one always to his men. He was an invaluable officer."

The Planters' Chronicle.

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THE U. P. A. S. I.

(INCORPORATED.)

Contents.

The Chairman has been passing through Bangalore on his way to the West Coast.

We publish the Minutes of the first Quarterly Meeting of the South Travancore Planters' Association.

We regret that Mr. Morrell, Sittar Estate, has for some time been deprived of the solace of the *Planters' Chronicle*, and in connection with this matter we would earnestly request members of District Associations, to notify change of addresses.

R. D. A. kindly furnishes us with a contribution on Markets, Prices and Statistics.

A correspondent sends us extracts from the Annual Report for 1915-16 of the Standing Committee of the Planters' Association of Malaya on Labour.

We pay a tribute of respect to the late Mr. Harry Ormerod.

We publish the first portion of the interesting lecture delivered by Mr. W. Macrae, the Government Mycologist.

We have heard from the Mercantile Bank of India, Ltd., that the Bank of Mauritius with its Head Office in London and branches at Port Louis (Mauritius) and Mahe (Seychelles) was absorbed by the Mercantile Bank of India, Ltd., on the 3rd instant.

There is to be a meeting of the Local Committee of the R. G. A. at Quilon on the 22nd instant and it is to be hoped that returns of Rubber Estates as asked for in a circular dated 1st April may reach this office from all District Associations not later than the 15th instant.

SOUTH INDIAN PLANTERS' WAR FUND.

	Rs.	A.	P.
Amount previously subscribed	44,228	12	8
Mr. Stephen Bayly	10	0	0
Total Rs...	44,238	12	8

OVERSEAS AIR CRAFT FUND.

To Balance	90	0	0

DISTRICT PLANTERS' ASSOCIATIONS.

South Travancore Planters' Association.

Minutes of the first Quarterly Meeting held at the Quilon Club, on 22nd April, 1916.

PRESENT.—Messrs. J. B. Cook (Chairman,) E. M. Ewart, H. S. K. Morrell, L. G. Knight, J. A. Anderson, A. W. Upcher, T. Jackson, W. R. Stainforth, A. J. Moore, and J. O. Gray. *Visitors*:—Messrs, J. Mackie, J. A. Gwynne, W. Clare, A. R. Shaw and L. A. Lampard.

Agenda:—1. To read and confirm minutes of the last Meeting,
2. Correspondence.
3 New Members and Honorary Members.
4. Election of Delegate for Bangalore.
5. Discuss new Rules.
6. Forest Land Regulations.
7. Pests Act.
8. Rubber Growers' Association.
9. New Tea Export Duty.

Chairman.—Before proceeding with the business of the Meeting I wish to mention that one of our members who went to the War has been killed in action—Lieutenant A. V. Cree. He was only in this District for a short time, but all of us who knew him, liked him. He was a man, and died for his King and Country. I move that a vote of sympathy from us be forwarded to his mother. Carried in silence all members standing.

The notice calling the Meeting and Minutes of last Meeting were taken as read.

New Members.—Proposed by Mr. J. B. Cook and seconded by Mr. A. J. Moore that Mr. J. A. Gwynne, Honorary Secretary of the Travancore Combined Planters' Association, be elected an Honorary Member.—*Carried.*

Delegate for Bangalore.—Resolved that Mr. A. W. Leslie be asked to act as our representative, and that Mr. J. B. Cook will also attend.

Planters' Chronicle.—Mr. Morrell, of Sittar Estate, said that he had not received this paper for a long time, and another member mentioned that he received more than one copy. The Honorary Secretary was asked to make out a complete list of members of the Association to whom the *Planters' Chronicle* should be sent, and forward it as early as possible to the Secretary of the U. P. A. S. I.

Rules.—A few suggestions for the alteration of certain rules were brought forward, which will be discussed at the next Annual General Meeting.

Forest Land Regulations.—The Honorary Secretary of the Travancore Combined Planters' Association gave the Meeting an account of what has been done up to date, and after a lengthy discussion, it was resolved: "That this Meeting is of opinion that Government should be asked to revert to the old rules in force prior to 1915 as the proposed new rules practically prohibit all further planting extensions and that the matter be referred to the Travancore Combined P. A. to take action."

Pests Act.—After a long discussion, it was decided that as this Act does not refer to Travancore that the matter be left to the Associations affected. The Travancore Government intend to bring forward a Pests Act for this State, and the Honorary Secretary was asked to write to the Secretary, U. P. A. S. I. to this effect.

Rubber Growers' Association.—As all Rubber Estates in this Association already subscribe to the R. G. A., there was no discussion.

Tea Export Duty.—The injustice of a double export duty being imposed on Travancore-grown teas by the British and Travancore Governments was fully discussed, and it was resolved to leave the matter in the hands of the Travancore Combined P. A., who have asked the U. P. A. S. I. to take the matter up strongly.

Read Mr. Anstead's letter of 19th February and resolved that the Honorary Secretary be asked to try and arrange for Mr. Anstead to visit the Ponmudi District, Koney Estate, and the Kalthuritty Valley.

The Meeting closed with a vote of thanks to the Chair.

(Signed) J. B. COOK,
Chairman.

(„) A. W. LESLIE,
Honorary Secretary.

Copra from Queensland.

Cocoanut cultivation, though still a small industry in Queensland, is rapidly extending. Hitherto it had been supposed that Copra from Queensland cocoanuts did not contain enough oil to be of commercial value, but the examination of a sample of copra from these nuts at the Imperial Institute has now established that the oil content is normal and the copra of good quality, and brokers state that shipment would be readily saleable in this country at good prices. It is interesting to note that before the war the bulk of the copra shipped to Europe from Ceylon, India and elsewhere was crushed in Germany and France. Urgent representations on this subject were made by the Imperial Institute on the outbreak of war to the oil-seed crushing firms in the United Kingdom, some of whom have now started to work copra, with the result that there is a new and good market for the product in this country which is likely to expand when the new factories now building start work.—*The Rubber World.*

The Potash Deposits in Alsace.

The deposits of Potash salts in Alsace as described by Henri Blin in a recent article in the *Revue Generale des Sciences*, cover an area of about 50,000 acres. They are estimated to contain 3,000,000 tons of Potash, which would suffice at the present rate of use to supply the world for five centuries. The Potash is chiefly in the form of chloride.—*The Gardeners' Chronicle.*

MARKETS, PRICES, AND STATISTICS.

COFFEE.

Brazil receipts to 3rd April.

1916.	1915.	1914.	1913.
13,581,000.	11,204,000.	12.500,000.	10,459,000.

Auctions were suspended from 31st March to 8th April. Offerings have been:—

	29th March to 4th April.	Total since 1st July.	Last year to 31st March.
East India	327	2,073	7,447
Costa Rica	5,925	42,354	37,923
Other Milds	1.471	44,962	55,296
Brazil	2,310	19,680	46.660
Robusta	...	309	9,641
East Africa and Uganda ...	180	6,464	3,355

PRICES.

	No. 1.		No. 2.		No. 3.		PB.		T.	
MYSORE.										
Kirkie Coondah ...	27.	76/	17.	72/6	6.	65/6	9.	N.	4.	65/-
Balehonnur ...	33.	N.	25.	71/-	4.	65/-	16.	75/-	8.	66/-
Kotordie ...	7.	N.	11.	N.	5.	N.	6.	N.	4.	N.
Ootsey ...	6.	74/-	7.	69/6	2.	60/-	2.	73/-6	2	60/-6
Buskull Park ...	46.	N.	18.	69/-	2.	61/-	5.	N.	5.	65/-
Poghully ...	7.	N.	18.	69/-	11.	66/-	8	N.	8.	65/-
UGANDA.										
JN. S. ...	20.	65/-	40.	59/-	25.	54/6	7.	73/6		...
	25.	64/6								
	20.	62/6	10.	55/6	11.	51/-	3.	65/6		...

The Coffee market has been very quiet waiting for the Budget. The new duty is exactly what had been anticipated and the general opinion is that the effect will be to turn attention to the cheaper qualities at the expense of the better. The increased duty on Chicory may have a considerable effect on the consumption of some of the Proprietary brands of roasted coffee.

Tea.

Tea has been in rather less demand and prices a little irregular.

Prices obtained at the sales of 3rd and 5th April :—

	B.P.	B.O.P.	Pek.	P.S.	P.F.	B.T.	O.P.	B.P.S.	Fgs.	Dust.
Travancore.										
Mount ...	11	...	10½	10	...	...	...	...	...	...
Pambanar ...	11	...	10¼	...	10	...	...	...	...	...
Kolie Kanum ...	10¾	1/11¾	10¼	...	...	...	...	...	...	...
Pasumullay ...	10½	11½	10	...	...	...	...	...	...	...
Fairfield ...	10½	11	...	...	10	...	...	...	...	...
Kolam ...	10¾	...	10	9½	...	...	...	...	...	...
Penairiwai ...	11¾	...	...	...	11¼	...	...	...	10¼	9
Haileyburia ...	...	11	9¾	...	...	...	...	...	...	...
Poonmudi ...	...	...	9¾	...	...	...	...	...	...	...
White Hills ...	10	...	9¾	...	...	...	...	...	...	...
Vambenard ...	10¼	11¼	9¾	...	...	...	...	...	...	...
Bonaccord ...	10	10¼	9¾	...	...	9¼	...	...	...	...
Carady Goody ...	10¾	...	...	9¼	...	...	9¾	...	...	...
Wynaad.										
Chulika ...	10	10½	...	...	...	...	10¼	9½	...	...

Prosperity of Japanese Tea Trade.

Tea transactions, says the *Japan Advertiser*, November 9, are now ended for the present year. The trade was on the whole prosperous, owing to increased consumption in the belligerent countries and to smaller exports from China, India and Ceylon because of the scarcity of ships. The export of Japanese tea to Canada, the United States and Russia saw a remarkable increase. The amount shipped from Cobe, Yokohama, Shimizu and Yokkaichi during the five months from May to September, 1915, reached 33,151,708 lbs., showing a gain of 4,709,007 lbs. over shipments in the like period of 1914.

Rubber.

There has been very little demand and prices have gradually fallen. There are no South Indian sales to report. Prices on 6th April were, Crepe. 3/4. Sheet. 3/3½.

Spices.

Pepper has been very quiet under the influence of the new export restrictions imposed on spices.

The Cardamon market is at a standstill until it can be ascertained whether Cardamons, which are usually classified as "drugs." are affected by the restrictions on "spices" or not.

Companies.

The Report of the Poonmudi Tea and Rubber Co.. Ltd., states that 809,522 lbs of Tea were harvested produced at a cost of 4·90*d* f. o. b., and 48,755 lbs of rubber, produced at a cost of 9·51*d* f. o. b. In the rubber fields interplanted with tea the former has overgrown the latter and most of it has been taken out. The estimate for current year is for 800,000 lbs of tea and 50,000 lbs of rubber.

Statistics.

Government Reports recently published given the following figures for 1914—15 for Bengal, and Bihar and Orissa.

		Bengal.			Bihar and Orissa.
Total area	...	53,931,504 ac.			71,534,893 ac.
Forests	...	4,258,106 ac.			4,732,776 ac.
Not available for Cultivation	...	11,227,341 ac.			10,056,447 ac.
Area cropped	...	25,208,100 ac.			26,027,300 ac.
Tea					
Jalpaiguri	...	101,300 ac.	Hazaribagh	...	100 ac.
Darjeeling	...	53,200 ac.	Ranchi	...	2,100 ac.
Chittagong	...	4,500 ac.			
Chittagong Hills.	...	100 ac.			
		159,100 ac.			2,200 ac.
Chinchona					
Darjeeling	...	2,600 ac.			

The Annual Report of the Malaya Planters' Association gives the following figures of Rubber output :—

Total F. M. S. ... 44,524 tons
Whole Peninsular ... 70,214 tons
or 73 per cent. of the world's plantation supply.

	1914. Tons.	1915. Tons.	
Selangor	14,015	19,120	
Perak	11,042	16,663	
Malacca	6,766	11,022	
Johore	5,358	9,167	
Negri Sembilan	5,278	8,177	
Penang Province Wellesley	2,426	2,643	(?)
Kedah	1,030	1,889	
Pahang	362	564	
Kelantan	307	536	
Singapore	423	433	

R. D. A.

The following is taken from the Annual Report for 1915-1916 of the Standing Committee of the Planters' Association of Malaya presented at the Ninth Annual Meeting of that Association held on the 26th April 1916:—

LABOUR.

The importation of Labour from Southern India continues to be controlled by the Indian Immigration Committee under Rules and Regulations which have now for some considerable time remained unaltered. It might be in place here briefly to describe them.

The Committee was created in 1907 with the primary object of encouraging and promoting a free flow of Indian labour to the Peninsula. It was given statutory powers to levy an assessment on all employers of South Indian labour, and the money so raised forms the fund which is administered by the Government with the Committee's advice, the Government defraying the cost of administering the Department both in this country and in India.

One of the aims of the Committee was to encourage all employers in this country to individual effort in recruiting in India, thereby eliminating the unsatisfactory practice of "Local Recruiting" by which a section of employers were placed in a position to compete successfully for the services of labourers introduced into the country by other employers at considerable expense. To encourage and develop this latter form of recruiting, a payment known as a "recruiting allowance" is made from the fund to employers for each labourer recruited in India and brought over to this country.

The amount of assessment levied and recruiting allowances paid vary with the position of the fund, the rates in force for 1915 having been:—

Assessment, $1 per quarter, calculated on 78 days' work.

Recruiting allowance, $5 per head.

Other payments made from the Fund include:—

Train fares of Immigrants from villages in India to Depots at Negapatam or Madras.

Feeding at depots while awaiting embarkation.

Passages from India to port of disembarkation.

Quarantine expenses at the port of disembarkation.

Transport from port of disembarkation to Estate.

It will thus be seen that the cost to the employer in importing labour is theoretically only the commission paid to the Kangany or recruiter in India. If therefore the commission is low enough, the cost will not exceed the recruiting allowance made.

The assessment rate of $4 for 312 days' work is equivalent to 1·28 cents per working day, which would appear to be a very small price to pay for the maintenance of the system.

The volume of immigration from India, which was checked in 1914, increased appreciably during 1915, and that it has not again reached normal dimensions is largely due to a dearth of steamers.

The following are the figures supplied by the Labour Authorities, of arrivals and departures of Indian Immigrants for the past 10 years:—

	Arrivals.	Departures.	Nett. Gains.
1906	... 52,041	21,879	30,162
1907	... 62,274	30,522	31,752
1908	... 54,522	30,920	23,602
1909	... 49,817	31,374	18,443
1910	... 83,723	39,080	44,643
1911	... 108,471	48,103	60,368
1912	... 106,928	63,885	43,043
1913	... 118,583	70,090	48,493
1914	... 51,217	63,073	11,856 loss.
1915	... 75,323	50,320	25,003

The conditions under which Indian labourers are employed in this country have greatly improved in recent years. Housing accommodation and sanitary arrangements have been bettered and the average health of immigrants would compare favourably with that of towns in England. The only remaining blot is the drink problem, and the Association has been pressing throughout the year for more effective measures.

Wages earned average from 30 to 40 cents per diem, and allow of good living and a fair margin for savings, which at the high exchange value of the dollar, can be profitably remitted to India.

As an index may be taken the amount remitted to India during the year by money order, viz:—

From Federated Malay States	...	Rs. 3,531,793
From Straits Settlements	...	„ 2,654,140

The fact remains, that there is not yet sufficient labour in the Peninsula and until there is, it is obvious that complaints will continue as to unfair competition for what labour there is locally available. Such has in fact been the case and the Association throughout the year has had to deal with the question of absconding, Crimping and cognate matters. The attitude of the Government has not been one of ready sympathy and it is perhaps significant to note a recent speech of the Viceroy of India, in which he announced that on the representation of his Government, two Colonies, Figi and Trinidad, had already agreed to repeal all punitive legislation in regard to labour offences, other than fines.

The following figures obtained from the Labour department show the Indian populations on Estates in the F. M. S. and Colony as at 31st December, 1915:—

	Straits Settlements.		F.M.S.
Penang	... 240	Perak	... 50,908
Province Wellesley	... 9,277	Selangor	... 63,778
Dindings	... 1,515	Negri Sembilan	... 10,073
Malacca	... 7,869	Pahang	... 1,588
Singapore	... 928		
	19,829		126,347

The number of Indian labourers employed on Estates in the F. M. S. is thus estimated at 126,347 as compared with 120,000 a year ago. With the development of the Rubber Industry it is being found that fewer labourers are required per acre than was at one time anticipated, but for some years to come any falling off in requirements in this respect will probably be counterbalanced by the substitution of Indian for Chinese labour in districts which have not yet been developed sufficiently long to have become suitable for the employment of the former.

Chinese are still largely employed on Estates in Negri Sembilan, Malacca, Johore and parts of Perak and Selangor. A dearth of this class of labour caused by the repatriation of some 12,000 in 1914/15 and the stoppage of immigration from China led to smart increase in the rate of wages. Unrestricted immigration was resumed in July 1915, though only after many representations to the Government had been made by the Association to that effect. That the position is now less acute, than at one time it threatened, can be seen from the subjoined table, which gives the estimate estate population of Chinese in the F. M. S. for the last three years:—

	1913.	1914.	1915.
Perak ...	3,236	4,085	4,809
Selangor ...	8,478	5,441	6,110
Negri Sembilan ...	12,186	12,829	15,075
Pahang ...	1,181	1,645	1,452
Total F. M. S. ...	25,081	24,000	27,446

Tin prices have been high throughout the year, but it is believed that the attraction to Chinese of employment in mines has greatly decreased, now that more permanent and easier work can be obtained by them on estates at almost equally good rates of pay: and there is no doubt that the system of paying tappers by individual results, which has recently become much more general, has had a good deal to do with the present greater attractiveness in Chinese eyes of employment on European Estates.

Javanese labourers on Estates are of two classes, those brought from Java district under contract during the past 12 years, and those who find their own way to the country or are born in it. It is much to be regretted that the supply of Javanese on contract is now greatly restricted. However, on holdings of their own throughout the country there are many thousands of Javanese who have settled and reared families and who form an appreciable asset to the country.

The relative estate population on December 31st in the F. M. S. was, as regards Javanese, as follows:—

	1913.	1914.	1915.
Perak	6,292	5,661	4,211
Selangor	3,007	1,968	1,738
Negri Sembilan ...	1,949	1,850	1,447
Pahang	949	636	960
Total F. M. S. ...	12,197	10,115	8,356

Malay labour forms a not insignificant part of Estates' tapping forces in North Perak, Province Wellesley and Kedah. They usually belong to districts near to where they are employed and in many cases have proved reliable and efficient workers. In the F. M. S. labour returns, this class of labour represents the bulk of what is returned as "Other Labour" the figures for which are as follows :—

	1913	1914	1915
Perak ...	5,580	4,742	5,555
Selangor ...	1,240	804	906
Negri Sembilan ...	1,295	1,192	1,657
Pahang ...	377	382	474
Total F. M. S...	8,492	7,120	8,592

It is regrettable that official statistics of others than Indian Estate labourers are not kept in the Colony and we can therefore only give the total Estate population for the four States of the Federation, which has been estimated by the Controller of Labour as follows ;—

	1913.	1914.	1915.
Perak ...	67,660	61,991	65,483
Selangor ...	89,804	69,786	72,532
Negri Sembilan ...	27,442	26,326	28,252
Pahang ...	3,344	3,576	4,474
Total F.M.S...	188,250	161,379	170,711

Although therefore it is evident that the requirements of labour are still considerably short, there is every reason to hope that, once adequate transport facilities are again available, all the labour required for estates will be forthcoming at reasonable rates of wages.

THE LATE MR. HARRY ORMEROD.

A week ago, on Sunday the 30th April, passed peacefully away from a stroke of heat apoplexy Mr. Harry Ormerod, who had been Secretary of the United Planters' Association for seventeen years.

He was first elected Secretary in the year 1896 and resigned that appointment in 1912 ; and during that lengthy period helped to steer the Association from comparatively small beginnings till it ultimately occupies its present position of increasing influence and authority. During his tenure of office and by his unvarying courtesy and application he commanded the respect of all.

He first owned and edited the paper called *Planting Opinion* which in 1906 was altered to *The Planters' Chronicle* and became the Official Organ of the United Planters' Association.

After severing his connection with that body his activity in journalism was manifold. He leaves a widow and son to mourn his loss to whom the sympathy of all will be extended. "His pen is rust, His soul is with the Saints we trust."

FUNGI.

Fungi chiefly with relation to Plant Diseases.

The following is a digest of the lecture delivered by Mr. W. MacRae, the Government Mycologist, at the recent Madras Exhibition on 5th January 1916, and is reproduced from the February issue of *the Journal of the Madras Agricultural Students' Union.*

Fortunately in a tropical land like India, this subject requires but little introduction, for all are familiar with fungi in some of their aspects. Fungi are low forms of plant life. All being devoid of chlorophyll, none of them are green. Chlorophyll is the green substance in the leaves of plants by means of which, in the presence of sun-light, they can take the salt-solutions absorbed from the soil by the roots and the gases of the air and from them can manufacture food to build up their own structure. Plants that do not contain chlorophyll are unable to do this and therefore must make use of nutriment already manufactured by the plants possessing the requisite chlorophyll. Fungi, then, cannot make their own food from simple substances but are entirely dependent on other plants or on animals. They may get it either out of living plants or from dead or decaying vegetation. In the latter case, where the nourishment is obtained from leaf mould, cow-dung, bread, wood and such like substances, fungi really do useful work in decomposing the dead matter and rendering it again available as plant food although when they attack bread or timber in houses they are looked on from an economic point of view as destructive agents. In the first case, the fungi which derive their food directly from living plants are called parasites or parasitic fungi while the plants on which they live get the name of host-plants.

When a green plant becomes infected by a parasitic fungus, it has additional work to perform having to provide food for itself and also for its self-invited guest. In some instances it is quite capable of doing this and remains unharmed but in other cases the extra work is beyond its power and it succumbs. The fungus may devour all the food destined for its host-plant's necessary functions or it may derange the starch-making machinery of the leaves and the host-plant dies of starvation. It may stop up the water-conducting tubes of the stem and the host-plant dies of thirst or by weaving a covering completely over the leaves it may prevent air from getting access to the tissues and the host-plant dies of suffocation.

Parasitic fungi, then, are the renegades of the vegetable world. They are all dependents. Many are thieves, stealing openly for all the world to see or secretly in dark places. Some are murderers and fratricides bringing lingering or sudden death. They have given an evil reputation to the whole group of fungi, in some cases well merited but in others quite undeserved, for fungi are not wholly bad. Some have redeeming features, for instance a few are edible; many, notably those that live in the soil, transform the dead matter into humus which forms a rich store of food for our crop-plants. And even the worst of them have developed a degree of resourcefulness that gives cause for admiration. As examples of the diseases caused by parasitic fungi, leaf-spot in tumeric, fruit spot of chillies, long smut on cholam, ephellis on paddy, red-rot of sugarcane, canker in white Babul may be mentioned as familiarly found in the Presidency.

(Secondary leaf-fall of Hevea, Leaf Disease and Black Rot of Coffee, Brown Blight of Tea, Stump Rot.—ED.)

These examples show the appearance of diseased plants and now we wish to know what the fungi themselves are like. We shall begin with a fungus that is well known to every one and is large enough to be seen by the naked eye, even though it does not cause disease, *viz*., an edible mushroom so common in grassy fields and by hedgerows during the monsoon. It consists of two main parts; one is an umbrella-like structure and is above ground, while the other consists of a mass of threads and is below ground. These two parts have different functions to perform. The umbrella-like part is the fruit and contains the seeds or spores. If we lay a fresh mushroom from which the stalk has been cut on a sheet of paper, in an hour or two we shall see radiating lines of a light brown powder on the paper. The powder consists of little round things. Each one is a seed, which, if it gets into suitable soil with plenty of organic matter, the right amount of moisture and a suitable temperature, will germinate and grow into another mushroom plant. The mass of threads in the soil composes the rest of the fungus plant. They bore among the dead roots, leaves and stems of plants in the soil and absorb food from them. This is the vegetative part of the fungus. All fungi have these two parts, a more or less complex fruit and a simple vegetative body composed of threads.

Different fungi vary greatly in the form and size of the fruit body while the absorbing part, the threads, is comparatively simple. The complexity of the one part and the simplicity of the other are corelated with the function which each part has to perform. The fruit or spore-bearing part is pushed up into the air above the stuff on which the fungus is growing in order that the seeds or spores may have a better chance of being blown or carried away to other places. Hence this is the part of the fungus we generally see. The thread-like part of the fungus absorbs food and is embedded in the stuff on which the fungus grows whether it be soil, bread, chillie fruit, cumbu leaves or the branches or roots of trees. Hence this part of the fungus we seldom see, unless we look carefully for it.

Reproduction.—The fungi do not produce seeds in the sense in which we use the term when we speak of cholam seed, mango seed or cotton seed but they produce exceedingly small bodies which answer the same purpose and these we call spores. Spores originate in two ways, either as sexual spores in which two germs unite and form a new individual or as non-sexual spores in which a part of the body of the fungus is separated off as a spore.

The Sexual method of reproduction involves the fusion of two parts and this gives the new fungus-plant the advantages of a double parentage. The sexual spores are usually resting spores, *i.e*., they remain dormant for a time and germinate only after a period of rest. They serve to carry the fungus over unfavourable seasons and thus perpetuate its existence from year to year.

By the non-sexual method of reproduction a small fragment of a thread is cut off and this may be accomplished in many ways.

1. Spores may be produced at the ends of simple or branched stalks singly or in chains.

2. They may be produced at the ends of simple or branched stalks inside small cases or boxes.

3. They may be produced in little sacks embedded in the tissue of the host plant.

4. They may be produced in little bags inside a flask-shaped cavity, the number of spores in each bag being constant usually 8, sometimes 4 but always constant for one and the same fungus. These are but a few of the arrangements according to which spores are produced by fungi.

The spores themselves vary much in size, in shape and in ornamentation of their surfaces. Some spores of one of the fungi causing rust on wheat are so small that 5,000 of them placed in a line touching one another would measure only one inch. While if those of another rust on a grass were placed end to end in the same way only 300 of them would occupy an inch. They show great diversity of form varying from the simple sphere to the spiral and the many-celled spore. The ornamentation on spores is also diversified and the roughnesses, hairs and hooks may all serve to attach the spore more readily to leaves or branches or wherever their suitable environment may be. Some spores have long cilia which lash backwards and forwards and propel the spore through drops of water. Naturally these fungi are water-loving plants and grow best either submerged in water or in those places where the monsoon is heavy *e.g.*, the spores of the bud-rot fungus on palms and of the Mahali fungus on arecanuts are swimming spores though, of course, each of these fungi has another type of spore as well. As a rule there is one kind of spore for quick distribution from host-plant to host-plant during the growing season and another kind of spore (a resting spore) made to lie dormant during that part of the year when the host-plant is not growing. Certain fungi have carried this development of different types of spores to a remarkable extent as for example in one of the rust fungi where there are four different kinds of spores each for a particular function in the life history of the fungus besides a fifth kind of spore that has quite lost the power to perform its function.

Some fungi on the other hand can reproduce themselves without forming spores at all. A few threads of the fungus weave themselves tightly into a little ball which becomes separated from the fungus plant and, later on, when it gets into a suitable place, the threads grow again. This is a lazy method of reproduction but it is quite effective as is seen in the damage done to potatoes by such a fungus.

Dissemination of Spores.—Just as the higher plants utilise many agencies for the purpose of distributing their seeds over as wide an area as possible so the fungi make use of these same agencies for the dissemination of their spores. For the majority of fungi the *wind* is the agent for carrying spores away and enabling them to reach a suitable situation. Thus it is, that most fungi produce their fruit-bodies exposed to the air, *e.g.*, the mushroom raises its umbrella-like fruiting body into the air and at maturity sheds its spores when they can be caught by light puffs of wind and carried off. The spores of smut on cholam are shaken out into the wind by the movement of the host plants. Their position in the ear-head is of advantage as the height gives them an increased radius of distribution. Such fungi usually produce spores in enormous numbers. Hundreds of thousands usually fail to develop where one or two find suitable conditions and give rise to mature plants. This is because the spores being so very minute cannot contain a great deal of nourishment and cannot therefore withstand unfavourable conditions of germination for any length of time. These fungi make up for the danger of failure by a prodigal formation of spores. *Man* is also an important agent in the distribution of spores. During his commercial transactions in moving commodities, shipping grain, and in introducing plants to other countries, fungi are also introduced and spread over great areas. *e.g.*, rust spores are spread in straw packing, and

smut spores on grain. In a more restricted area spores and diseased plants are carried from field to field adhering to cart wheels, implements, animals and clothing and are even borne along in the water channels. *Insects* also distribute spores very successfully. An effective device has been invented by the fungus that causes sweet-ear disease of cholam. In the young grain a mass of much-branched threads produces numerous spores and also a sugary solution which attracts insects. As the insects sip the sweet liquid the spores become attached to their bodies and are carried off to other flowers thus rapidly spreading the disease.

The fungi that have swimming spores are dependent for their distribution on water either in streams or in rain running over the surface of the host-plant. These are but a few of the many ingenious ways which individual fungi have discovered for dissemination of their spores in order to secure the perpetuation of their kind.

Germination of spores.—When a spore of a fungus gets into a moist warm place, it sends out a thin thread and, if there is a sufficiency of suitable food, the thread branches and grows into a full fungus-plant which again produces spores. If the fungus is a parasitic one and the spore rests on a suitable part of the host-plant the thread may either remain on the outside of the host-plant or go inside it. In the former case, the fungus always remains outside and only sends little sucking tubes into the outer cells of the host-plant to get nourishment, *e.g.*, the mildews, a familiar example of which is the mildew on tobacco which causes so much loss. Most parasitic fungi, however, penetrate the tissues of the host-plant. The thread that grows from the spore goes in, either through one of the small breathing pores, or through an open wound or it actually bores in by secreting a ferment which dissolves the tissue of the host-plant and makes a way for the advancing threads of the fungus. Once inside, the threads of the fungus ramify between the cells of the host-plant or actually penetrate them and live inside. Some fungi live in a happy symbiotic relationship with their hosts. The host may simply supply food to the fungus without detriment to itself, or the fungus, especially some root fungi, may even help the host to absorb food material from the soil. On the other hand, parasitic fungi may kill the cells of the host-plant either locally or to such a degree as to destroy the whole of the infected plant. Most of these fungi, after a period of vigorous growth, come to the surface and again produce spores for their further increase.

(To be Continued.)

CORRESPONDENCE.

"A" By. 58th Bde., R. L. A.,
11th Division,
M. E. F.,
March 12th, 1916.

S. I. Planters' War Fund.

Dear Sir,—I have to thank you for your letter of 9th November received here February 6th 1916.

I have no doubt there will be ample scope for the good use of the Fund before the end of this damned War.

Yours faithfully,
R. L. PEEL.

To
The Secretary,
United Planters' Association of Southern India,
Bangalore.

The Planters' Chronicle.

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(Secretary's Registered Telegraphic Address "Planting," Bangalore.)

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THE U. P. A. S. I.

(INCORPORATED.)

Contents.

The Deputy Director of Agriculture, Planting Districts, contributes an article on Smoking Rubber, Destruction of Rats in the Field, Rose Mildew and Madras Agricultural Statistics.

We publish the Proceedings of the Central Travancore Planters' Association which will be found full of interest to the Planting Community.

R. D. A. continues his weekly contribution on Markets, Price and Statistics.

We conclude a digest of the address by Mr. MacRae, Government Entomologist reproduced from the Journal of the Madras Agricultural Students Union.

In our correspondence columns we publish a very interesting letter from C. E. M. B. It is a very human document, fresh from the field, describing at first hand what the writer terms a "priceless show" and doubtless typical of thousands from the various fronts. We wish the writer a speedy recovery. We wish we could receive and publish more of the same type.

Will some one kindly answer "Arabi's" query?

On the 22nd of this month there will be held at Quilon a Committee Meeting of the South India Branch of the Rubber Growers' Association and on the 23rd a Scientific Department Committee Meeting.

SOUTH INDIAN PLANTERS' WAR FUND.

	Rs.	A.	P.
Amount previously subscribed	44,238	12	8
Mr. R. Lescher	25	0	0
Anamallai Tennis Tournament Lottery ...	76	0	0
Total Rs...	44,339	12	8

OVERSEAS AIR CRAFT FUND.

Balance	90	0	0

SCIENTIFIC DEPARTMENT, U. P. A S, I.

Smoking Rubber.

An enquiry has reached us about the best wood to use to produce a dense smoke for curing rubber. Any kind of jungle wood may be used, but it should not be too green as the smoke will then contain too much moisture with the result that the rubber will dry slowly and is apt to be over smoked. The best results will be obtained with a judicious mixture of dead dry timber with green wood. Hevea logs obtained from thinning out may be used, but they should first be stacked in the sun to dry.

It is not so much the kind of wood which is used as the type of furnace which produces the best smoke. A comparatively slow rate of combustion should be aimed at. This will produce a dense smoke with a low proportion of fine ash to contaminate the rubber in the smoke house. The draught should be kept low and the combustion regulated so that the wood glows and smoulders, leaving a high proportion of charcoal at the end instead of white ash. This charcoal may be utilised, by the way, for making suction gas.

Destruction of Rats in the Field.

The following extract from an article on Rat and Mouse plagues by Mr. T. F. Main which appeared in the *Poona Agricultural College Magazine* for October 1915 and was quoted in the *Agricultural Journal of India* for January, may interest Tea planters who suffer from the depredations of Rats.

The author says that the most successful method of dealing with rats adopted in the past was to dig out the burrows, but this is a laborious process and various alternative methods have been tried. Concealing arsenic, barium carbonate, or glass in small pieces of food has been tried but has been not proved effective due partly to the fact there is abundance of good food and hence any addition to it does not make any special appeal to the rats, and the natural instinct of the rats which undoubtedly warns them against such food after the first few deaths. The invariable experience with poisoned baits has been considerable success for a day or two followed by failure. Trapping is not practicable, the numbers being too large. The most efficient plan which we have so far discovered for use against field rats is fumigation, by means of a white ant exterminator, consisting of a vessel within which charcoal and sulphur are burnt and to which is attached a flexible wire tube and pump for discharging the sulphur fumes into rat holes.

In practice it is usual to find that several holes are connected one with another by run-ways in all directions, and it is necessary to stop up all bolt holes before pumping in the sulphur fumes. The machine is then worked for about three minutes. For this purpose one *tola* of sulphur powder per hole is required and about sixty to eighty holes can be fumigated in a day by a party consisting of two trained coolies at a total cost of less than one rupee in sandy soil. It was feared that fumigation would prove difficult in the black soil where large cracks extend in every direction, but it has been found possible to work it on these soils if an extra cooly be employed to assist in scraping loose soil over the cracks. In this way it was found that the sulphur fumes spread through an area varying from one tenth to one half *gantha* according to the length and width of the fissures, and for this purpose one and a half to two *tolas* of sulphur were used, the time required for such an operation varying from five to seven minutes.

A white ant exterminator is rather an expensive machine costing some sixty eight rupees when imported, but it is hoped to get suitable machines made in the Presidency at a much lower figure.

Rose Mildew.

We are often asked for a remedy for the white powdery Mildew which so commonly attacks the leaves of Roses in gardens. The usual way of combating this fungus is to dust flowers of sulphur over the leaves in the early morning when they are wet with dew. *The Hawaiian Forester* recommends the following treatment in cases of a bad attack. Dissolve one ounce of copper sulphate in one pint of hot water. Dissolve two ounces of carbonate of soda in one pint of hot water. Mix the two solutions and let the mixture stand for a few hours, then add one and a half liquid ounces of ammonia and enough water to make one and a half gallons of spray mixture and with this spray the plants thoroughly. The spraying should be repeated again in two or three days.

Another spray which is recommended is to boil one pound of sulphur with one pound of quicklime in five pints of water for ten minutes with constant stirring while boiling. Allow it to settle and pour off the clear liquid for use. Dilute this one hundred times with water and use as a spray.

Madras Agricultural Statistics.

The following figures are extracted from Government Reports :

Madras Presidency, 1915.

Total area	... 89,602,324	acres.
Forests	... 13,008,343	,,
Not available for cultivation	... 23,068,031	,,
Fallow	... 8,687,780	,,
Cultivable waste ...	... 10,657,292	,,
Total crop area ...	... 38,344,000	,,
Acreage under Tea ...	... 65,054	,,
Export of Tea ...	... 22,000,000	lbs.
Population	... 43,122,250	
Births	... 1,340,168	
Deaths	... 998,267	

Exports to Foreign Countries.

	Average for 5 years. Rs.	1914—15. Rs.	Percentage of total export.
Coffee	... 1,32,58,745	1,67,96,736	7·36
Tea	... 1,22,03,969	1,45,14,170	6·76
Rubber	... 15,11,949	73,02,582	3·40
Oil Cakes	... 50,61,868	47,19,365	1·97
Fish	... 22,31,835	19,03,524	0·89
Manures	... 13,73,882	8,28,468	0·39

RUDOLPH D. ANSTEAD,
Deputy Director of Agriculture, Planting Districts.

DISTRICT PLANTERS' ASSOCIATIONS.

Central Travancore Planters' Association.

Proceedings of the first Quarterly General Meeting of this Association held at the Travellers' Bungalow, Peermade, on Saturday, 29th April, 1916, at 10 a.m.

PRESENT.—Messrs. F. Bissett, (Chairman), J. S. Wilkie (Vice-Chairman), J. A. Richardson, H. C. Westaway, R. Tait (*by proxy*), R. P. Roissier, T. C. Forbes (by P. A.) C. A. Mackenzie, F. Winterbotham and W. A. J. Milner (Honorary Secretary).

The notice calling the meeting was read. The Proceedings of the last meeting of the Committee Meeting at Stagbrook on 25th March were taken as read and confirmed.

The Chairman then said:—"Since we last met the District has been honoured by a visit from His Excellency the Governor of Madras, which was much appreciated and, though the first, we trust it will not be the last visit we shall receive from a Madras Governor."

Correspondence.—All correspondence since the previous meeting was read.

Read letter from the Commissioner of Police dated 29—1—16 stating that he thanked the Association for wishing to present a silver watch to Mr. Subramonia Pillai, Sub-Inspector of Police, but that he regretted that the Sub-Inspector cannot be permitted to accept the reward. Read letter from Mr. C. A. Mackenzie resigning from the Tea Thefts Committee. Proposed from the Chair that as no Secretary, Tea Thefts Committee, has been appointed the P. A. Honorary Secretary be instructed to write and ask the members of the Tea Thefts Committee to elect a Secretary.—*Carried.*

Export Duty Deputation.—The Honorary Secretary was empowered to settle Mr. H. C. Westaway's account for his travelling expenses to attend this deputation.

Export Duty on Tea.—All the correspondence on this subject having been circulated amongst all members before the meeting this was not read. At the Committee Meeting held at Stagbrook on the 25th March Mr. Westaway was appointed to attend a meeting of the Combined Travancore Association at which the following resolution was passed:—"That this meeting protests against the tax on tea as imposed at present by the Travancore Government and the British India Customs Authorities. The meeting cannot think that it is the wish of the Authorities that Travancore grown tea should pay a double duty and request that steps be taken at once to determine who is to get the tax.

It is also requested that all teas sold on forward contracts prior to the 29th February 1916 be exempted from the duty. Provided it is agreed that the Travancore Government get the tax it is requested that all teas sold for consumption in the Empire of India be exempted to otherwise Travancore grown teas will be at a great disadvantage over teas grown in British India."

At this meeting the following gentlemen were chosen as a deputation to meet the Dewan on the subject namely: Mr. Stewart, Mr. Westaway, and Mr. Richardson. A hearty vote of thanks to Mr. Westaway was carried for attending as our delegate.

Mr. Richardson then said: "The results of that deputation have been circulated. We are now given to understand that the matter has been referred to the Government of India, requesting them to release us of the double tax now imposed, one of which we have not the slightest doubt will be refunded. Financially we are unaffected as to which Government this tax is paid. With reference to Forward Contracts the Travancore Government have given us the assurance that the same rules as passed in British India will be adhered to in Travancore so that assuming that one tax is removed, the only point on which we are at controversy with Government is the exemption of tea sold for consumption with the Indian Empire, which is undoubtedly of mutual benefit to the planter and general public, and we cannot for a moment believe that it was the intention of either Government to put Travancore teas at a disadvantage to any others grown in the Indian Empire.

I should therefore like to propose the following resolution 'That we ask the U. P. A. S. I. to memorialise the Government of India through the Madras Government regarding the very serious infliction of a double duty on Travancore teas whereby their teas have at present to pay an export duty from Travancore, and a further export duty on shipment from Cochin. Also, that of all teas grown and sold for consumption within the Empire of India, Travancore tea alone is penalised by a duty. We therefore request that the Government of India to immediately order the collection of one duty only at port of shipment.'"

Mr. Richardson's resolution was seconded by Mr. J. S. Wilkie, who said "Without due intimation a tax was levied by the Travancore Government collectable on their frontier. This in addition to the Imperial duty throws on Travancore tea a burden which I am sure was never intended by the Government of India." Carried unanimously. It was decided to send a copy of the resolution to the Resident.

Timber Values.—Read letter from the Honorary Secretary Travancore Combined Association dated 2nd March enclosing copies of letter received from Government containing their proposals regarding forest land regulations. Also read letter from the Honorary Secretary, Mundakayam P. A., pointing out that the proposals as embodied in the Chief Secretary to Government's letter differed considerably from those given in the circulated report of the deputation to the Dewan.

The matter was discussed and it was proposed by Mr. Richardson and seconded by Mr. Westaway that copies of the resolution passed at our Committee Meeting on 25th March be sent to Government, the Travancore Combined Association, each Travancore Association and the Resident. The Resolution referred to ran as follows:—

"That this Association wishes to revert to the old waste land rules as the present proposals *re* timber values shut down all prospects of further planting development."

Sri Mulam and Quilon Delegates Report.—"Mr. Chairman and Gentlemen,—As instructed I attended as your Delegate the 12th Session of the Sri Mulam Popular Assembly on the 21st February and following days. There is, I hope, no need for me to make a long report as I have already circularised all members on the subject I brought up, namely, the Kodamatha Landing at Kottayam. As you know, the Dewan explained that shortage of funds was the cause of the great delay in the completion of the Landing but undertook to push this through before this monsoon provided we would lend the necessary money which he promised would be repaid at the beginning of next Malabar year *viz.* about September. The Mundakayam Delegate, Mr. Eaton, ably supported me and as you know the M. P. A. has agreed to find half the money required. As regards ourselves the support of 7395 acres in all has been promised and as the Chief Secretary to Government has just written me that the D. P. W. now estimate they will require but Rs. 5,500 from both Associations, our half share will only come to Rs. 2,750 or a fraction under 6 as. per acre, and not Rs. 4,000 as I originally asked for. I have only to add that I believe the work on the Landing is now being pushed on with and to thank you for electing me as your Delegate to the Sri Mulam.

With regard to the annual Meeting of the Travancore Combined Planters' Association on the 18th February, which I also attended as your delegate on the way to Sri Mulam, there is also no need for me to say much as a full report of the meeting has already appeared in the *Planters' Chronicle*. I need only state that I think it was unfortunate that the attendance of members was so poor, only 2 out of 5 planting representatives and 2 from the Commercial Firms being present. I cannot help feeling that a Travancore Combined Association does satisfy a crying need and it is a pity that it should not always meet with the support in the way of delegates it deserves. Occasions are bound to occur on which it is absolutely imperative for the whole of Travancore planting opinion to be represented. The Double Export Duty is a case in point of course. Personally speaking I would like to see the annual meeting of the Combined Association attended by not only one but 2 or 3 delegates from each local Association and would also like to see sent as these delegates the very best and most experienced representatives each district can nominate. Let the annual meeting be a thoroughly representative and influential conference of all Travancore Planters as well as of representatives from the Commercial Firms interested in planting.

This is really all I have to say, gentlemen, in connection with the Quilon meeting I attended and I must apologise if I have taken up too much of your time over my report."

A hearty vote of thanks to Mr. Milner was proposed by Mr. Westaway and seconded by Mr. Bissett and carried unanimously.

Committee.—The Meeting unanimously decided that the Honorary Secretary write Mr. Leahy asking him under Rule 4 if he will serve as a member of Committee.

With a vote of thanks to the Chairman the Meeting closed.

(Signed) W. A. J. MILNER,

Honorary Secretary.

MARKETS. PRICES, AND STATISTICS.

COFFEE.

Brazil receipts to 8th April, 1916.

1916.	1915.	1914.	1913.
13,680,000.	11,327,000.	12,583,000.	10,502,000.

Offerings have been :—

—	5/7 April.	Total since 1st Jany.	Last year.
East India	2,412	4,485	7,447
Costa Rica	4,686	47,040	37,933
Other Milds	929	45,881	55,296
Brazil	625	20,305	46,660
Robusta	...	309	9,641
British East Africa and Uganda...	191	6,675	3,355

PRICES.

	No. 1.		No. 2.		No. 3.		PB.		T.	
MYSORE.										
Kent's KH. ...	37	81/6	63	77/-	28	71/-	16	82/-	16	70/-
Honeyvale ...	89	82/6	45	77/-	15	71/-6	10	86/-6	9	68/6
Hirvati ...	47	N.	26	N.	7	68/-	8	90/-	6	68/-
Utollalu ...	78	N.	52	73/6	9	68/-	26	80/-	16	68/-
Dataypore ...	7	82/-	12	75/6	7	69/-	2	82/6	4	65/6
Buskull ...	46	73/-	19	67/6	3	63/-	6	74/-	12	66/-
Moodsoosie ...	18	N.	16	N.	4	68/-	5	N.	3	67/-
Chetenhulli ...	18	N.	24	N.	7	68/-	5	N.	5	67/-
Biccode ...	26	N.	16	N.	3	67/-	11	N.	...	...
Cannon M. ...	43	N.	30	N.	5	N.	5	N.	8	69/6
Cannon B. ...	29	N,	36	N.	15	N.	5	102/-6	7	N.
COORG.										
Aynsley ...	31	79/6	17	73/6	...	...	4	76/-	12	68/-
Corringabetta ...	76	N.	49	N.	1	60/-	16	76/-	10	66/-
Jumboor ...	34	N.	15	N.	3	N.	7	N.	7	N.
Deverah Kadu ...	76	N.	55	N.	8	66/-	32	78/-	20	67/-
Hanchi Betta ...	50	N.	26	N.	2	62/-	6	80/-	15	67/-
WWF. B, ...	33	N.	22	N.	1	64/-	7	80/-	12	68/6
Eliza ...	131	N.	114	N.	8	67/-	27	78/-	...	...
Kibberi Betta ...	31	N.	29	N.	3	65/-	7	78/-	6	66/-
St. Edmunds ...	33	N.	28	N.	2	N.	11	N.	6	66/-
Bajee Collie ...	30	N.	23	N.	1	N.	5	N.	7	66/-
Netley ...	67	N.	20	N.	...	...	14	N.	...	...
Balakadoo ...	40	N.	13	N.	...	...	7	N.	...	...
Hope ...	11	N.	15	N.	2	65/-	4	N.	8	67/-
UGANDA.										
NUEL ...	22	65/6	7	58/-	2	54/-	6	72/6	...	...
JN. S. ...	41	64/6	24	58/6	14	53/-	8	69/6	...	...

The coffee market has been quiet but generally steady. The disappointing quality of the new East India crop has turned buyers who were waiting for it on to other kinds; only about half the quantity on offer was sold in auction, but some further progress has been made privately.

Tea.

The following figures are issued by the Indian Tea Association : –

Black Tea.	1916. lbs.	1915. lbs.
Sailings to Great Britain in March—		
From Calcutta	10,639,061	1,617,349
From Chittagong	4,551,335	5,850
From 1st April 1915 to 31st March 1916 ...	229,024,884	223,934,938
Sailings to Australia and New Zealand—		
In March	357,776	286,134
From 1st April 1915 to 31st March 1916 ...	9,580,073	10,978,798
Sailing to North America—		
In March	388,494	81,759
From 1st April 1915 to 31st March 1916 ...	11,963,812	8,318,855
Sailings to other places—		
In March	1,321,683	4,404,160
From 1st April 1915 to 31st March 1916 ...	52,057,190	33,513,196
Sailings from South Indian ports—		
In March	2,433,344	2,507,015
From 1st April 1915 to 31st March 1916 ...	21,664,078	21,188,406
Total sailings from 1st April 1915 to 31st March 1916	324,290,037	297,934,193

Sailings from South Indian ports in March, 1916.

Cochin—	
To London	1,057,338
To Asiatic Ports	5,163
Tuticorin, (direct) –	
To London	320,291
To Colombo	28,000
Calicut—	
To London	1,003,662
To Colombo	11,700
To Bombay	2,750
To Calcutta	4,440
Total ...	2,433,344

The following prices were obtained for South Indian Tea in the sales taking place during the week commencing 10th April :—

	O. P.	B.O.P.	P.B.P.	Pek.	P. S.	P. F.	Pek.F.	Fgs.
Wynaad.								
Auda Tode ...	11	11¼	11	10¾	10¼	...	....	9½
Travancore.								
Yellapatti ...	...	...	1/-¼	...	...	...	...	1/-¼
Vagavurrai ...	...	1/-¼	1/-¼	...	...	...	...	...
Nullatanni ...	...	...	1/-	...	...	...	...	...
Periavurrai ...	...	...	1/-¼	...	...	1/-¼	...	...
Sevenmallay ...	...	...	1/-¼	...	...	...	...	...
Kallar ...	...	...	1/-½	...	10¾	...	...	...
Chokanaad ...	...	...	...	...	...	...	11½	11½
Luckham ...	...	...	1/-	...	...	...	...	...

Tea was firm at the end of the week and there was a strong demand with advancing prices on 12th April, there was practically nothing under 11*d*. There are no South Indian teas up for sale next week.

Rubber.

The following prices have been obtained for South Indian Rubber during the week under review :—

Eldorado Crepe	...	... 3/3 — 3/3¼
Kerala Smoked Sheet	...	... 3/2¾
Kutikul Smoked Sheet	...	... 3/3
Kutikul Brown Crepe	...	... 3/1

1711 lbs. of Yendyar Rubber sold at Rs. 1'97 at the Colombo auction sales on 28th April.

The market has remained very dull. Smoked sheet is down to 3/3 and Crepe 3/3½. On 13th April 3/2 and 3/2½ respectively.

Spices.

Pepper market quiet but firm. Fair Tellicherry nominally 8¾.

Cardamons are to be treated as "spices," although always sold as "drugs" in England. Consequently they come under the export restrictions. The market is quiet, values unchanged.

R. D. A.

FUNGI.

Fungi chiefly with relation to Plant Diseases.

(*Continued.*)

The changes in the host plant.—Parasitic fungi often cause abnormal growths of their host-plants and it is by these, that we usually recognise the disease.

A few cells only may be infected and minute leaf-spots may be formed. If such spots are numerous and in those instances where the whole leaf is infected great harm may be caused to the plant by interference with the starch-making processes of the leaves.

The fungus may cause various organs of the plant to rot, *e.g.*, the fruit-rot of chillies and of areca-nuts and the bud-rot of palms.

A fungus, attacking cocoanut and palmyra palms, softens and rots the young leaves in the crown and ultimately kills the bud. This is a deadly form of disease in the case of those two palms because each tree has only one bud and after it is destroyed the tree can never produce a single new leaf. In a year or two it is quite dead and reduced to a bare pole.

The fruits of the host plant may be entirely replaced by the fungus, *e.g.*, in the short smut of cholam where instead of a ripe seed we find a mass of black powder which is but the spores of the smut fungus. This fungus has an interesting life history. It gains entrance to the cholam plant when the latter is in the seedling stage and never at any other time. It remains near the growing point keeping pace with its growth without affecting it detrimentally until the grain is beginning to fill. Then the fungus penetrates all the grain tissues, appropriates the food material and forms its smut spores.

On the branch of a tree a boil or canker may be formed which remains open for years. The tree produces healthy tissues to try to heal up the open sore but the fungus as persistently destroys the tissue. Some of these cankers reach huge dimensions, *e.g.*, on the white babul the cankered surface may extend to five feet.

Control measures for the prevention of fungus diseases may by applied along one or more different lines, *i.e.*, good cultivation, seed selection, general sanitation, growing disease-resistant varieties and application of chemicals that are fungicides.

The first and most important thing to do, is to maintain the host-plant in a thoroughly favourable environment and so keep it vigorous and healthy. This is done by *good cultivation.*

2. *Seed selection.*—Then we must choose seed for sowing from healthy plants only and in most cases this is the easiest and most natural means of controlling a disease *e.g.*, the fruit disease of beans and the fruit-rot of chillies are carried over from crop to crop by diseased seed. Diseased pods almost always contain diseased seed even though no spot is visible on the seed. Thus in selecting seed for sowing either of these crops we should choose only those from pods that have no discolouration on their surfaces and discard all from discoloured pods. Cuttings and tubers taken from diseased plants should not be used for propagation because they will

only reproduce the disease, *e.g.*, every ryot who cultivates sugarcane is familiar with the red-rot that causes so much loss. The disease is carried on from crop to crop by planting cuttings or setts from affected plants. Any cane with the characteristic red colouration should not be used for planting the new crop.

3. *General sanitation.*—It is well known that some diseases live over the dry weather in fallen leaves or fruits or dead branches. The destruction of such diseased material is an important means of keeping a disease from spreading. Sometimes whole plants should be destroyed, at others only infected parts need be. To burn the infected material is the safest way of rendering it innocuous but this may be impracticable, then it should be buried in trenches to a sufficient depth. By doing this we lessen the number of spores and so reduce the chances by which the fungus causing disease may infect the plants of the new crop.

4. *Growing resistant varieties.*—Just as it is possible to select or develop varieties which produce improved fruits or grains so it is possible to secure varieties resistant to disease. The individuals of a variety or the varieties of a species are not always attacked to the same extent by any given parasitic fungus. Some individuals or varieties, often those of best quality, are always affected, others only occasionally. By patient unremitting labour these resistant plants may be selected and bred season after season till a definite variety is produced which combines the advantages of superior quality with resistance to disease. This method can be applied properly only by a skilled plant-breeder. In northern India this has been done successfully for wheat. There a variety of wheat quite suitable for those purposes for which wheat is used, has been produced which is resistant to the rust fungus that causes such immense loss in this crop.

Application of fungicides.—A fungicide is a substance that will kill or prevent the growth of a fungus or the germination of its spores. It must be strong enough to destroy or hold in check the injurious fungus but not enough to harm the host-plant nor the human being or the animals that may use the plants as food. Fungicides are applied usually either to the seed or to the growing plant. In the former case the intention is to destroy spores attached to the seed that would germinate at the same time as the seed and infect the seedlings, *e.g.*, cholam seed from a crop affected with smut is steeped in a weak solution of copper sulphate. This kills the smut spores adhering to the seed and the seedlings are protected. After the seedling stage is passed this smut cannot infect a cholam plant. During this season in the Nandyal and Kurnool districts, seed for 17,000 acres of cholam was treated so with good results.

When a fungicide is applied to a healthy plant, the latter receives a coating of fungicide in order to prevent the germination of spores that may subsequently fall on it *e. g.* in the West coast arecanuts are subject to a fruit-rot called Mahali that causes immense loss during the monsoon. If the nuts are sprayed with a mixture of lime and copper sulphate they get complete protection. Spores landing on nuts thus covered do not germinate. This year the bunches of nuts on 10,000 trees in Malabar were sprayed with excellent results. This particular fungicide is called Bordeaux Mixture. It is one of the oldest and best medicines and is used more extensively than

any other. It derives its name from Bordeaux in France where it was first used on grape vines in order to make petty thieves think the grapes were poisoned. It was noticed that vines so treated were less affected by the dreaded vine mildew. It is a mixture of copper sulphate, lime and water. Many other fungicides such as formalin, corrosive sublimate and sulphur are utilised to combat specific diseases.

In order to get an even coating of the fungicide on a plant some kind of spraying machine is required. The small sprayer used by the people in Malabar to spray arecanuts is typical.

It is usually necessary to combine two or more of these ways of combating disease and it is always well to have the co-operation of one's neighbours. It is not of much use getting one's own crops free from disease if they are liable to be infected from surrounding fields. Generally it is not an easy matter to get a disease under control. It requires patient and persevering effort but the result well repays the trouble.

The treatment of some diseases presents particular difficulties to be overcome. The mildew of tobacco can be easily and effectively kept under control by dusting sulphur on the leaves but there is a fatal objection to this remedy in that the least trace of sulphur in the cured tobacco is intolerable both to the man who chews and to the smoker. Sulphur then is ruled out as a remedy and so are other chemicals. What then can be done to prevent loss from this fungus? The Mildew fungus hates light and fresh air and loves a moist still atmosphere. By planting the tobacco plants wider apart and attending carefully to irrigation the plants are in a position where they get plenty of fresh air and sun-shine and the air round them is not moist. Thus the tobacco plant is favoured and the fungus is discouraged.

Another example is the bud-rot of palms. As it is not practicable to spray palmyra trees with a fungicide, recourse must be had to the surgeon's knife. So familiar have the Tahsildars, Revenue Inspectors and Village Officers, who carry out in the field the operations against this disease, become with the symptoms that, in the majority of cases, they can detect a diseased tree before the central bud is killed. If they cut off every leaf base that shows the diseased spots, the fungus is completely removed and the tree grows a new set of leaves that are quite healthy. It is not possible to save every infected tree because the first outward sign of disease in some cases appears only after the growing point is dead and the tree is beyond recovery. When the central expanding leaf becomes yellow it is possible to save the tree by promptly cutting off all the diseased leaf-bases but unless this is done within the first 3 or 4 days it is useless as the bud is killed by the fungus meantime. In other cases rows of spots appear on the leaves and such a tree can be saved by prompt surgical treatment in every case.

In 1910 when we were not so familiar with the disease the number of trees that died was 74,000 and there were very few recoveries. In 1914, 33,000 untreated trees died and 41,000 recovered after treatment, while in 1915, 20,000 untreated trees died and 32,000 treated ones recovered. Thus in the last two years 73,000 palmyra trees have been saved from death and this means a considerable gain to the cultivators, besides which the disease is now more in hand than it has ever been.

CORRESPONDENCE.

Hospital Ship "Varela."

May 2nd, 1916.

My dear Father,—I hope you and Mother have not been very anxious about me. I saw Reggie at Karachi and asked him to wire to Ma and tell her I was doing well. I got a nasty knock in the counter attack at Beit Aiessa at about midnight on the 17th. We attacked and captured the trenches on the morning of 17th after a terrific bombardment—of course our artillery didn't stop at the right time and we couldn't stop so charged the Turks right through our own bursting shells, they were not ready or expecting us to attack till the bombardment ended, so we got them on the run, though they did some damage with the machine guns. We were in the front and with a Ghurka Regiment took the brunt of the attack. It was a priceless show—we lost 3 officers and about 100 men out of 370 in that. At dusk we were to have been relieved, but the Turks counter attacked and we were fighting hand to hand all night. I got hit about mid-night while leading a party bombing and bayonetting them out of a trench. I had got a slight one in the knee but didn't notice it till after. I was shot by a Turk I thought wounded so didn't put my bayonet through him, and as I passed he deliberately lifted his gun and got me in the face. He got the bayonet, and a couple of bullets from my men, as soon as I saw his game but not soon enough. I had an extraordinarily lucky hit, half an inch higher it would have got my eye, a little to the left and it would have got my brain and to the right a vein in my head to have hit which would have been fatal. My knee was a lucky one too, as it is just a skin deep one and a bit to the right, my knee would have gone smash.

I'm doing well but the whole of my face is paralysed on the right side and I doubt if I shall ever regain my hearing in the right ear. I can't eat anything hard. The doctor says when I am able to move I shall probably be sent home as my head won't stand the heat. Anyhow I won't be fit for service for six months.

I am afraid this letter isn't interesting but I want you to know how I am—there's nothing to worry about. I see by the papers that every officer in the regiment got hit and I hear the regiment was practically wiped out. Poor Lawrence died on board—the journey to Basra was Hell. I thought I would peg out. Cheer oh.

(Sd.) C. E. M. B.

Chickmaglur, May 6, 1916.

TO THE EDITOR,

The Planters' Chronicle.

Dear Sir,—If one wants anything made of iron in this locality one is asked first of all Rs. 6 per maund for the raw material. Can you or any of your readers tell me if I could dispose of old, worn out tools at this rate, and if so where?

ARABI.

SCIENTIFIC DEPARTMENT, U P. A. S. I.

Scale of Fees for analysis in the Bangalore Laboratory.

A.—SOILS.

		Rs.
1.	Complete Chemical Analysis, including the available Potash and Phosphoric Acid	...40
2.	Mechanical Analysis	...10
3.	Complete Chemical and Mechanical Analysis ...	...50
4.	Calcium carbonate and oxide content	...10

B.—FERTILISERS.

1.	Potash in Potassic Fertilisers	8
2.	Phosphoric acid, total and citrate soluble, in Phosphatic Fertilisers	8
3.	Organic Matter, Insoluble Matter, and Nitrogen in Poonacs, &c.	6
4.	Organic Matter, Insoluble Matter, Nitrogen, and Phosphoric acid in Bones, Fish, &c.	8
5.	Complete Analysis of Fertilisers such as Composts, Cattle manures, &c.	...20
6.	Complete Analysis of Lime, Limestones, and Slaked Lime	...10

Half the above rates will be charged to all Members of District Planters' Associations.

For methods of taking samples of Soils and Fertilisers and the quantities to send for analysis see *Planters' Chronicle* Volume X pages 207 and 216.

All samples for analysis should be sent plainly labelled to "The Planting Expert, 25, South Parade, Bangalore," and should be accompanied by a covering letter giving full information about the sample and the analysis desired according to the above table. Fees should be remitted to "The Secretary of the United Planters' Association of South India, 25, South Parade, Bangalore.

The Planters' Chronicle.

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THE U. P. A. S. I.

(INCORPORATED.)

Contents.

The Deputy Director of Agriculture, Planting Districts, has gone to Madras to confer with the Director of Agriculture, Madras, whence he will proceed to Quilon to attend the meeting referred to last week, returning to Head Quarters on the 26th instant. He has contributed an article on Markets, Prices and Statistics.

The Director of the Labour Department will also be absent from Bangalore from the 18th to 30th inclusive and from June 4th till further notice at Coimbatore.

A Correspondent has sent us for publication an article by Harry Storey, taken from the *Ceylon Planting Gazette* on the Labour question.

We publish the first portion of a lecture by Dr. E. J. Russell, of Rothamstead, before the Chemical Society, reproduced from *Nature* on the principles of crop production.

Our Correspondence columns contain a letter from "Optimum Quod Primum who seeks for a fellow sufferer.

The Honorary Secretary, Coorg Planters' Association sends us a new record of the number of those who have left his District to serve. Other Districts will be able to do the same and end with the same lament "we are cleaned out of men here."

SOUTH INDIAN PLANTERS' WAR FUND.

	Rs.	A.	P.
Amount previously subscribed	44,339	12	8
Mr. W. H. G. Leahy	20	0	0
Mr. W. A. J. Milner	20	0	0
Mr. N. D. Pollock	30	0	0
Mr. D. V. Crowe	7	8	0
Mr. L. E. T. Short	10	0	0
Total Rs...	44,427	4	8

OVERSEAS AIR CRAFT FUND.

Balance	90	0	0

MARKETS, PRICES, AND STATISTICS.

COFFEE.

Monthly Statistics to 31st March.

	1916. tons.	1915. tons.	1914. tons.
East Indian.			
Landed to 31st March ...	251	701	1,363
Delivered to 31st March ...	945	1,023	528
Stock on 31st March ...	634	1,135	1,084
Coffee of all kinds.			
Stock in U. K. 31st March ...	28,500	16,850	20,000
Total European imports to 31st March ...	107,950	154,300	220,470
Total European deliveries to 31st March ...	115,940	153,065	168,180
Total European Stock to 31st March ...	198,470	257,060	480,350
World's visible supply ...	519,700*	565,530	744,000

* A decrease of 27,415 tons as compared with a decrease of 23,765 tons last year.

All Africa.			
Imports to 31st Match ...	270	224	237
Deliveries to 31st March ...	220	273	230
Stock on 31st March ...	325	166	245

Brazil receipts to 15th April.

1916.	1915.	1914.	1913.
13,803,000.	11,495,000.	12,655,000.	10,559,000.

Offerings at auction have been :—

——	11/14 April.	Total since 1st Jany.	Last year.
East Indian	2,415	6,900	8,833
Costa Rica	4,680	51,720	44,731
Other Milds	967	46,848	61,045
Brazil	3,488	23,793	49,525
Robusta	...	309	10,241
B. E. A. & Uganda	...	6,675	3,661

PRICES.

	No. I.		No. 2.		No. 3.		PB.		T.	
MYSORE.										
HC. S. ...	96	N.	30	76/6	4	69/-	16	88/6	19	70/-
Santawerry ...	47	N.	21	N.	2	64/6	5	90/-	8	68/6
	62	87/-	23	N.	2	70/-	5	96/-	5	70/-
Barguai ...	9	82/-	10	N.	3	66/6	3	82/6	3	65/6
Mockett S. & L. ...	30	N.	15	N.	3	60/-	4	N.	6	67/-
Nugger ...	53	77/-	20	71/6	3	66/6	4	75/-	...	...
Alagaishwara ...	37	73/-	30	70/6	5	65/-	11	N.	14	68/-
Kulhutty ...	62	95/6	21	85/-	2	69/6	8	109/-6	5	73/-
Belgode ...	18	N.	17	72/-	12	70/-	6	75/-	...	...
Sanderson K. ...	31	78/6	22	72/-	3	65/-	8	78/-	12	68/-
Kent's KH. ...	13	80/-	31	76/-	20	72/-	5	N.	10	67/6
Macdougalls ...	17	N.	15	71/-	7	67/-	7	79/-	5	66/-
H. DD. ...	46	N.	22	N.	2	66/-	12	80/-6	13	67/-
Attikhan ...	21	N.	9	76/-	...	...	1	84/-	2	66/-
Gorrayhatti ...	29	N.	8	N.	...	...	3	85/6	3	67/6
Oliver's K. ...	39	80/-	7	74/-	...	...	3	84/6	3	67/6
	20	85/-	...	...	...	...	...	...	...	...
	11	84/6	14	76/6	2	69/-	5	100/-	2	68/-
Maynard's QH. ...	10	77/6	15	72/-	...	...	4	86/-	...	...
KTT. ...	24	78/-	23	73/-	7	67/6	10	82/6	9	68/-
Nugger ...	67	N.	20	71/6	...	...	...	...	...	...
Biccode ...	17	N.	8	75/-	2	67/-	6	97/-	...	...
Kent's Chick ...	22	77/6	7	71/-	1	62/-	5	N.	3	63/-
COORG.										
Aynsley ...	43	N.	18	N.	...	...	10	77/-	14	68/6
Balakadoo ...	68	N.	28	69/-	2	63/-	19	N.	10	65/-
Santicoopa ...	38	75/-	11	69/6	...	...	7	78/-	...	...
Faith ...	74	78/-	24	73/-	...	...	15	108/6	...	...
Cota Kadoo ...	156	N.	67	N.	1	65/-	27	80/-	40	69/-
Netley ...	36	N.	14	N.	1	N.	13	76/6	13	67/6

Public sales are suspended till 2nd May. The market in the absence of Public sales has been quiet. The small business done privately in East India has been mostly in the lower qualities at steady prices.

TEA.

There were no sales of South Indian Tea this week. The market closed very firm. Almost anything is worth 10¾*d.*

RUBBER.

No South Indian sales reported. Market very quiet, but steady. Smoked Sheet. 3/1¼.

SPICES.

Pepper.—Dull and rather easier.

Cardamons.—Some enquiry but the "permit" formalities make things move slowly.

COMPANIES.

The Stagbrook Rubber and Tea Estates Co., Ltd., have published their annual report from which it appears that 520,174 lbs. of Tea were harvested during the year at a cost of 4·79*d.* per lb. f. o. b. and 150,000 lbs. of Rubber at a cost of 1 0·03 per lb. f.o.b. The estimate for the year 1916-17 crop is 539,000 lbs. of Tea and 180,000 lbs. of Rubber.

R. D. A.

THE LABOUR QUESTION.

It will be as well, perhaps, before commenting on the present state of things, to examine briefly the causes that have gradually led up to the very undesirable condition of our labour force.

There seems to be little doubt that the root of the whole trouble, the pernicious "tundu" system, originated during the coffee days in a very simple and natural manner.

An estate, from a variety of causes, might find itself with an excess of labour over requirements—what more natural, therefore, than that the superintendent should write to a neighbour and ask if he can take on a gang of coolies owing "so much"! From, we will say, this beginning custom gradually established and asserted itself and has now become a many-headed Hydra likely to devour us, or, to say, the very least of it, which has placed us in an abominable position and plunged our coolies, willy-nilly, into a perfectly hopeless and degraded condition of debt with all its attendant worries, petty meannesses, and inducements to lie, cheat and deceive tending towards their utter demoralization. Where the money goes to, it is difficult to say. Certainly a considerable amount is sent to India usually for the benefit of the kangany, but undoubtedly a very large proportion is spent in "riotous living," useless extravagances and gambling. The "tundu" system worked well enough for many years until the demand for labour materially increased by reason of the opening up of new areas of cultivation. This gradually caused an unsettled condition of the labour force; old coast connections became broken up and superintendents experiencing difficulty in getting a sufficiency of new labour from the coast began to prey on each other's coolies on the principle of "every man for himself"—in fact what may now be termed a planting axiom in the shape of "get labour, honestly if you can, but get it" came into very real force. The kanganies and coolies soon found that, no matter what the amount of their debt, somebody would be certain to "purchase" the resultant "tundu." They also soon found that a demand on their part for a further *silarei* debt over and above the amount of the "tundu" was fairly certain of payment by an on-taking estate. Then came the rubber boom which, most certainly put the coping stone on the whole disgraceful structure! Proprietors and companies sent out orders to open land at once at all cost, with the result that fabulous amounts were paid in advances and abnormally high wages were offered to all and sundry, with the result that many tea estates adjoining the rubber low-lands were more or less despoiled of their old-established labour force and had to replace at vastly increased cost in the shape of advances. The crying evil of all this was that old-established labour forces owing only a small amount per head began to demand outrageous and unreasonable sums of money to bring their debt up to the level of the amounts per head being paid on the rubber estates and for replaced labour. "Give me more money or I'll take my tundu" became a common threat even from old respectable kanganies born and bred on an estate! This is not mere generalization—chapter and verse can be given of innumerable incidents of that nature.

All this sort of thing has worked for the gradual demoralization of the cooly vastly assisted by our present labour laws which seem to offer every inducement to the cooly to cheat and deceive his employer! From being the "most honest man in the world" the cooly is rapidly deteriorating into an unmitigated rascal and kanganies are nothing more or less than barefaced buyers and sellers of labour, in many cases grossly cheating their

coolies, but also in many cases overborne and dictated to by their hopelessly indebted coolies. In former days planting was a profession of real interest and superintendents could and did keep thoroughly in touch with their coolies but now the sordid and degraded never-ending troubles over debt, debt and nothing but debt have made life a misery to the Superintendent and however keen and earnest a man may be his enthusiasm rapidly evaporates. Nevertheless matters are as we have made them! We walked into——waded into the mess with our eyes open and are now very deep in the mud! It is not the slightest use attempting a criticism of the many well-meant efforts that have been made to straighten out and regulate the abominable, unnatural and degrading debt system during many years past. Suffice it to say that Superintendents, agents and finally proprietors have, one and all, had a shot at it but have all failed and the sooner we have the sense to acknowledge that failure the better. It stands to reason that, no matter how thoroughly we federate or combine in an attempt to regulate or reduce the debt plague legitimately, so long as no such federation exists in the many Colombo mills, the Harbour Works, the P. W. D., the Government Railway and the vast number of native estates and gardens, all employing many thousands of Tamil coolies, the result is bound to be failure.

The position now is, that, whereas 15 years ago coolies might owe from Rs.10 to Rs.20 per head, at the present their debt is anything up to Rs.120 or even more! It is a rare thing to find even a single woman or child of plucking age owing less than Rs. 50, so that the vast majority of coolies are in a perfectly hopeless condition of debt which they cannot possibly pay off or even materially reduce! Nevertheless it becomes a claim of slavery to them by which they are dragged here and there all over the country destroying their natural sense of thrift and all interest in their work as a means of livelihood. If this does not mean demoralization what else can be the result? Would Rs.20,000,000 cover the amount of outstanding advances hanging like a mill-stone around the coolies' necks? Doubtful!

It is hardly necessary to remind the planting community of the appaling misuse of the affidavit and magistrates' certificates in connection with our present labour laws now being brought into lurid light, or the astounding interpretation of the law by magistrates in some districts, the magnificent ease with which bolting can be effected; the celerity with which a bolter can slip over to India and the ridiculously easy way by which he can return "whitewashed" by means of a falsely sworn statement at Mandapam. It is mere sarcasm to state that the law provides for the punishment of such delinquents! The pitiful fact stares us in the face that but for our appaling debt system such things could not be! There would be no necessity for our complicated labour laws, nor for our federations, our advance account or that cursed "tundu" system! There would be no debt "bogey" to turn our coolies into rascally criminals as now obtain! What is the remedy? We want more than a remedy—we want a thorough cure! The whole plague-spot of debt must be excised with a completion that will prevent any possibility of recurrence. We civilians have utterly failed in our attempts to effect a cure or even a palliation, and it is now up to Government to help the planting industry out of the hopeless mess it is rapidly getting into We are all by now perfectly aware of the fact that the debt question cannot be settled or even regulated by a set of rules that cannot be legally enforced! Most of us have known it from the very first! We have surely all grasped the fact by now, that, so long as the accursed

"tundu" system exists, or any other means by which debt can be passed on from estate to estate or even from individual to individual, nothing can be done to improve matters. Destroy that which *forces* coolies to leave an estate and no inducement ever remains. The keeping of coolies' debt accounts is only a feeble method of playing with the question and in no way tends towards settling it. It is merely a weak recognition of the existence of a canker we must use our utmost endeavour to get rid of. We cling to our "bits of paper" in the shape of pro-notes as a drowning man clings to a straw, and companies still parade their "advances" account as an asset "considered good and recoverable or add still further to their unproductive capital by creating a reserve fund to meet "loss of advances!"

Can any estate in Ceylon show the complete extinction of its advance account by legitimate recovery or even a *truly permanent* reduction of same? If such favoured estates exist they merely prove the rule of general hopeless indebtedness.

It is not, however, the debt due by coolies or Kanganies to the estate that is the great trouble so much as the frequently huge debt owed by the cooly to the Kangany over and above it and this is the debt that we foster and encourage by means of the "tundu"! We are told that the difference between our labour system and that obtaining in the Straits is the difference between Heaven and Hell! If so, surely what has been accomplished in the Straits can equally well be done here if we will only break through custom and tradition—but we, unaided, cannot do it! We, therefore, want a *strong man* to tackle the matter and let us hope that the "hour and the man" will arrive with our new Governor. If he was the promoter of the present satisfactory state of things in the Straits surely, surely we will look to him to cleanse our *Augean* stables!

If we can, by his help, clear up the present impasse our *quid pro quo* must be in the shape of an unmistakable legal barrier against any possible recrudescence of the disease that has oppressed us and our coolies for so many hopeless years,—*From the Planting Gazette* (*Ceylon.*)

HARRY STOREY.

Hase (A.) Weitere Beobachtungen über die Läuseplage. (Further observations on the plague of lice):—

The author was sent by the Ministry of War at Berlin to investigate the question of lice on the eastern front. Some individuals are never infested with lice, while others develop an insensibility to bites. This latter fact explains the indifference with which the civil population of Russian Poland view the presence of these parasites. An examination of 181 of the various prophylactics advertised showed that most of them were completely useless. It may safely be said that, up to the present, no really lasting preparation has been found; the very best are only effective for a couple of days. Even better class soldiers stated that dirty, greasy underclothing conferred a certain protection against infestation and it was found that the defective ventilation—due to the clogging by grease and dirt—caused a high temperature of about 86° Fahr., and that this is a deterrent to lice. Some of the men freed their shirts by laying them on ant-hills; this method was mentioned by Gaulke in 1863. The troops were all anxious to be freed from the pests with the exception of an East Prussian, who said that the little creatures reminded him of home.—*The Review of Applied Entomology.*

THE PRINCIPLES OF CROP PRODUCTION.

The following lecture delivered by Dr. E. J. Russell, of Rothamsted, before the Chemical Society is reproduced from the pages of *Nature*:

In any discussion of the principles of crop production it is necessary to begin with the year 1840. By that time it was definitely known that plants consist mainly of organic matter along with a little mineral matter—phosphorus, calcium, potassium, sodium, etc.—to which, however, very little importance was attached. The practical man knew that farmyard manure was the great fertiliser; he also knew that other substances, bones, salt, etc., had, in certain circumstances, considerable fertilising value. The most obvious facts were the large amount of organic matter in the plant and the large amount of organic matter in the best manures; and it is only natural that chemists and physiologists should have connectedthese, and argued that the subject of the manure was to furnish organic matter for the plant.

By a brilliant stroke Liebig, in 1840, brushed aside this obvious connection and declared that the true function of the manure was to provide, not organic matter, but the mineral constituents which the chemists had ignored. The first step, he said, was to find out what mineral constituents the plant contains, and then to supply these substances in a suitable form. If any one of them is lacking the soil is rendered infertile, and matters will not be put right until that one is added. Thus the whole art of manuring was reduced to an exact science.

Unfortunately Liebig's prescription failed in practice. The Rothamsted experiments showed that his ash constituents gave little better crops than no manure at all. Liebig had left something out; it was necessary to add nitrogen as well before complete growth could be obtained.

The critics urged that the effects would only be temporary; that in time the land supplied with "artificials" would give out. Experience has shown that this is not so; similar good results have obtained at Rothamsted over the long period of more than sixty years.

Part, therefore, of Liebig's principle is perfectly correct; the mineral constituents are indispensable and must be supplied to the plant. The mistake was to suppose that they were sufficient. We may take it as established that crops can be grown satisfactorily and indefinitely by supplying proper quantities of suitable compounds of nitrogen, phosphorus, and potassium. This we can call our first principle. Difficulties arise, however, directly one tries to develop it in practice. Trouble began with the attempts to find out what are suitable quantities to use. Liebig had supposed that the requirements of a crop could be gauged by the composition of the ash. Lawes and Gilbert showed that this was not the case. Thus the ash of the turnip crop contains a considerable amount of potash but only little phosphate; according to Liebig, it should have required mainly a potasssic fertiliser. Lawes and Gilbert showed, however, that it required phosphates and not potash, and they concluded that the special requirements of a crop could only be discovered by actual trial,

This view was developed in the sixties in a series of brilliant lectures by Ville. After numerous experiments he drew up the following list, showing the special need or, as he called, "the dominant," for each crop:—

VILLE'S LIST OF DOMINANTS.

Nitrogen	for	Cereals
,,	,,	Beetroot
Potash	,,	Potatoes
,,	,,	Vines
Calcium phosphate	,,	Cane-sugar
No dominant	,,	Flax.

In order to ascertain the special needs of the crop on a particular soil, he grew the plants on a series of plots, one of which was given the complete manure, whilst the others each had one constituent left out. Thus for wheat he obtained the following results, and, therefore, concluded that on this soil wheat requires a good supply of nitrogen, less phosphorus, and still less potassium:—

	Crop per acre. Bushels.
Normal manure ...	43
Manure without lime ...	41
,, ,, potash ...	31
,, ,, phosphate ...	26½
,, ,, nitrogen ...	14
Soil without manure ...	12

The method, of course, is perfectly sound, and it has been very widely adopted. It is, however, frankly empirical, and empirical work is never very inspiring, so that for a long time soil work came rather to a standstill.

It has several times happened in the history of agricultural chemistry that the new illuminating idea wanted to revivify the subject at a stagnant period has come in from some outside technical problem that had to be solved. So it was here. The growth of the towns and of stricter ideas on public health had brought into prominence the need for better sewage purification, and it was imperative that the problem should be dealt with somehow or other.

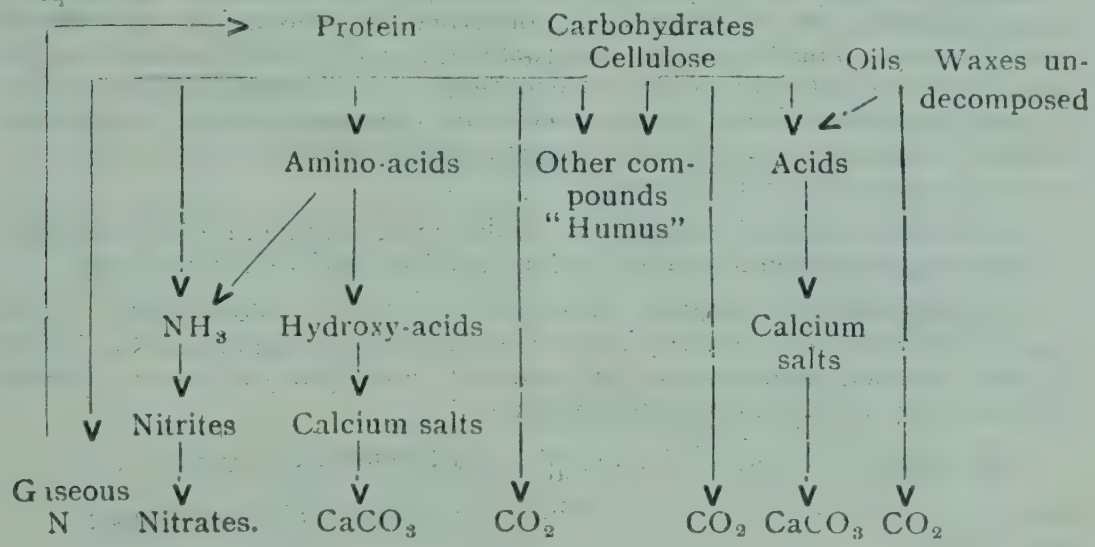
Schloesing and Muntz found that satisfactory purification involved the conversion of ammonia into nitrate, and by a brilliant investigation they found that this process was neither chemical nor physical, but biological. Their work was extended to the soil with remarkable results. It was seen that the soil was not a mere inert mass, but that it was teeming with life and pulsating with change. The number of bacteria is enormous, running into millions per gram, and the question is raised: How do these organisms live? They must have food, and they must have energy. We are therefore forced to go back to the soil and study it as a medium for the life of a soil population.

A very cursory examination shows that the soil forms only a thin layer; underneath it lies the subsoil, which is wholly different in colour, texture, and especially in its behaviour towards the plant.

Yet there was not always this difference. When the soil was first laid down it was all like the subsoil, and whenever a new surface becomes exposed, either by landslips, cliff-falls, etc., it is always the subsoil type that appears. The first vegetation has no great supply of plant nutrients, but plants suited to the conditions nevertheless spring up. They take what

they can from the crude soil, they take carbon dioxide from the air, they synthesise sugars, starches, cellulose, proteins, etc., deriving the necessary energy from sunlight. When the plants die they fall back on the soil and return to it all that they took, and a good deal more of new material besides. That introduces a fundamental change.

The new material thus added contains stores of energy and food substances suitable for the bacterial population, which forthwith flourishes. Decomposition goes on, nitrates, and other substances are produced, and the conditions are made more favourable for the growth of a new race of plants. One of the most obvious changes is the formation of nitrates, but other products are formed as well. It is proving exceedingly difficult to trace out full details, but the following is probably in the main accurate:—



Unfortunately, not much is known about the details, but the reaction is extremely important. The initial products are of little value to the crop or the soil. The final products are invaluable for plant nutrition, and some of the intermediate products are very valuable for the soil. This, therefore, is the reaction on which plant nutrition depends, and it is of the highest importance that it should proceed rapidly and smoothly. Where for any reason it does not, the soil becomes unproductive.

Scientific crop production depends largely on controlling this re-action. Three things are necessary: the conditions—the air supply, water, temperature, etc.,—must be favourable; the organisms must be of the right kind; and the supply of raw material – plant residues—must be kept up.

We shall see later on how the favourable conditions are obtained. Hitherto little has been done to control the organisms beyond improving the conditions, but beginnings have been made in the direction of inoculation and partial sterilisation. The supply of raw material is kept up in several ways; probably the oldest is to leave the ground alone; so that it covers itself with wild vegetation, which is then ploughed in. This formed part of the Mosaic law; it was the regular mediæval custom in our own country, and it is practised to this day in Connemara. It is too haphazard for modern use, however, and so nowadays the farmer grows a special crop with the express intention of ploughing in all or part of it, or of feeding it to animals and ploughing in the excretions.

(To be Continued.)

CORRESPONDENCE.

THE EDITOR,

Planters' Chronicle.

Bangalore.

Dear Sir,—You probably as usual will W. P. B. this short line of mere friendship. I only want to know if any other unhappy blighter of a Planter has struck the same run of bad luck that I have. On Tuesday we had the thickest thing in the way of cyclonic storms that I have seen in my 21 years' residence in the glorious land of Gold Mohurs and Visiting Agents. I have not yet had time to ascertain the damage it did here to my neighbours, but so far as I am concerned, it appeared to me a damn good Straafe. The bungalow roofs smashed, wire bridge costing Rs. 800 gone to Hellespont, and so far as I can judge in a cursory (Nice word that), ride round, about 3,000 rubber trees,—in tapping,—broken or uprooted. I saw several well over 30 inches in girth just snapped in two, as you break a match when you try to lean on it.

Very little rain with all this fuss, only '90 of an inch, but all that came found its way into the bungalow, and as usual we had a dear wet time.

Damage done estimated (cursorily) at about 5,000 Ruplets. Moral damage inestimable. For the sake of my comely colleagues on this Estate, do lets hear that someone else has suffered, and that the whole infliction has not been wasted on one poor blighter.

As usual, I sign myself "O. Q. P." and I believe I'll do it!

OPTIMUM QUOD PRIMUM

Coorg Planters' Association,

Sidapur, 7—5—1916.

THE SECRETARY,

U. P. A. S. I.,

Bangalore.

Dear Sir,—The number of men who have gone from Coorg to do their bit for their Country is 31, of whom 2 have been killed, J. A. Graham and H. L. Robinson, and we regret to hear that C. E. M. Browne has lately been wounded since sending you the former list.

G. L. Newbery and O. S Weymouth have sent in their names, the former has gone home and the latter has put in for the I. A. R. O. here. B. Thwaites is another, who though an invalid is doing his 7 hours a day at munitions. We are cleaned out of men here.

Yours faithfully,

PERCY G. TIPPING,

Honorary Secretary.

N. B.—32 with Thwaites.

The Planters' Chronicle.

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THE U. P. A. S. I.

(INCORPORATED)

Contents.

The Committee of the South India Branch of the Rubber Growers' Association held a Meeting at Quilon on the 23rd the attendance at which was rather spoilt on account of bad weather and the inability of members to attend. Mr. Marsden, Scientific Officer of the R. G. A., whose absence was regretted, had intended to attend but was held up by heavy floods in Ceylon.

A Committee Meeting of the Scientific Department was held at Quilon on the 22nd at which the terms of the Government Order which has been circulated were discussed and agreed to, and in the very near future a decided step in advance towards the accomplishment of a Government Scientific Department will be taken.

The Deputy Director of Agriculture, Planting Districts, did not return at once to Head Quarters, but has gone to Coonoor with instructions to arrange the working basis for the first rubber station.

R. D. A publishes some notes taken from the first Volume of the Agricultural Statistics of India.

Concluded in this issue is Dr. E. J. Russell's important and valuable article on the Principles of Crop Production.

We publish a summary of a second lecture by him title of which was "Man's Control."

Mr. Raikes writes on Agreements and Securities.

We are unable, however willing, to publish a letter from "Quo Fas et Gloria Ducunt," until he sends his *name*, not for publication, but as a *bona fides*.

The meeting convened by the Scientific Department for June 5th, will we trust be well attended especially by Coffee planters whose industry is the chief reason for calling the meeting. Though primarily called for their delectation, the meeting should interest all interested in Agriculture.

We would remind Honorary Secretaries of District Associations that the election of an Additional Member of the Legislative Council of Fort St. George should be held as soon as possible and the result returned according to the rules laid down.

THE AGRICULTURAL STATISTICS OF INDIA.

Volume I dealing with the Agricultural Statistics of British India for 1913-14 published by the Department of Statistics at Rs. 2/8 has just been received. The following facts and figures have been extracted from the pages of the volume before us as possibly being of interest to South Indian Planters.

The total area of India is 1,800,000 square miles, or 1,151,890,000 acres with a population of 315 millions, divided as follows:—

	Acres.	Population.
British Provinces including Native States under the control of Local Governments and Administrations ...	749,528,000	267,164,000
Native States having direct Political relations with the Government of India ...	316,391,000	44,767,000
Specially administered territories in Burma and the N. W. Frontier Provinces not included above	51,265,000	2,738,000
British Baluchistan	34,706,000	414,000

The area of the British Provinces only is dealt with in the volume under review and this includes 129,934,000 acres belonging to Feudatory and Tributary States under the control of Local Governments and Administrations. The area included in British Provinces, *viz.* 619,594,000 acres is classified as follows:—

	Acres.	Per cent.
Forests	82,623,000	13
Not available for cultivation ...	147,169,000	24
Culturable waste other than fallow ...	115,587,000	19
Current fallows	52,620,000	8
Net area cropped	219,192,000	36

In the Madras Presidency 38 per cent of the total area is cropped and there is a population of 121 per 100 acres on the cropped area; similar figures for Coorg are 14 and 127 respectively. The proportion of the cropped area which is under irrigation in Madras is 29 per cent, and in Coorg 3 per cent.

It is of interest to note that of the total area under crops in British India 82·1 per cent are devoted to Food Crops leaving only 17·9 per cent for non-food crops. Among the latter Coffee and Tea fall under the head of "Drugs and Narcotics" in this report. A total area of 92,000 acres are devoted to Coffee cultivation and 558,000 acres to Tea.

The following are the figures given in this volume for the Madras Presidency and Coorg:—

	Madras.	Coorg.
Total area	91,137,400	1,012,300
Forest	12,964,000	357,800
Area actually cropped ...	34,182,600	138,200
Current fallows	8,702,600	159,200
Culturable waste	10,643,900	21,400
Not available for cultivation ...	23,062,100	335,700
Irrigated area	9,853,500	4,100
Area under Rice	10,679,400	82,500
Area under Ragi	2,490,000	4,200
Total area under Food Crops ...	29,442,400	88,000
Area under Oil-seeds ...	3,176,700	300
Area under Sugar Cane ...	83,600	—
Area under Cotton	2,696,600	—
Area under Tea	26,800	—
Area under Coffee	43,500	42,100

The areas under Tea and Coffee in the different Districts in the Madras Presidency are given as follows:—

	Tea.	Coffee.
Vizagapatam	—	120
Salem	—	7,929
Coimbatore	—	381
Trichinopoly	—	85
Madura	—	4,890
Tinnevelly	—	651
Nilgiris	13,517	23,914
Malabar	13,306	5,537
South Canara	—	15

Rubber is classified in these statistics under the heading of "Miscellaneous Non-food Crops" and despite the fact of its growing importance and acreage is evidently not yet considered to be of sufficient interest to be worthy of separate classification, which we venture to think is rather a pity.

R. D. A.

SOUTH INDIA PLANTERS' WAR FUND.

	Rs.	A.	P.
Amount previously acknowledged	44,427	4	8
C. Fraser, Esq.	20	0	0
H. L. Pinches, Esq.	20	0	0
R. H. Crowther, Esq.	10	0	0
D. Elkington, Esq.	150	0	0
Miss Mary F. Woolley	30	4	0
Total Rs...	44,657	8	8

OVERSEAS AIR CRAFT FUND.

Balance	90	0	0
E. L. Koeclin	5	0	0
Total Rs...	95	0	0

THE PRINCIPLES OF CROP PRODUCTION.

(Continued.)

The second broad principle of crop production is, then, that the biochemical decompositions in the soil must proceed smoothly and rapidly.

New difficulties arise as soon as one begins to develop this principle. Reverting to the scheme just given, it is seen that the decomposition of proteins may proceed in two ways, either ending with nitrate or with nitrogen. Now the nitrate ending is desirable enough, but the nitrogen ending is highly undesirable. Yet this happens directly the process is speeded up too much. The more intense the cultivation becomes the more serious are these losses; they are bad on the prairies, but still worse under conditions of intense cultivation. To some extent this is inevitable; it is equally true of engines, but just as the engineer has increased the efficiency of engines, so the agricultural chemist has to increase the efficiency of the nitrogen utilisation processes.

Unfortunately, the purely chemical work on the decomposition of protein has not gone far enough to enable a full working hypothesis to be mapped out. The decomposition does not stop at amino-acids; under bacterial action there is a further change to bases and acids. These are under investigation in several chemical laboratories, but the results have not yet helped us much. Here, therefore, we have an economic problem of the first importance waiting for the solution of a chemical problem which, at first sight, seems rather academic and remote from practice.

These biochemical changes, important as they are in crop production, do not end the matter. The soil comes directly into the reaction. The calcium carbonate neutralises acids produced during the decomposition. The clay and some of the other constituents possess colloidal properties, so that all these reactions proceed on a jelly-like surface and not in a fluid medium, and they are liable to be affected by all the complications produced by surface actions.

The plant plays an even more active part. Its roots absorb some of the products—the nitrates, the phosphates—etc., —and might therefore be expected to hasten the whole process; but this does not happen. On the contrary, the growing plant appears to retard it, and nitrate is always formed in higher quantities on fallow than on cropped land, even after allowing for what is taken by the crop.

Whether the growing plant affects the nature of the change or only the rate is not yet known. The essential point is that, so far as plant nutrients are concerned, neither the soil nor the plant plays an entirely passive part. The soil is not an inert medium, and the plant is not a mere passive bucket into which the products of the reaction are drawn; each plays an active part, disturbing both the reaction and the distribution of the products.

The recognition that the plant is a living thing has broadened our conception of the factors necessary for plant growth. In much of the literature of the seventies and eighties it is tacitly assumed that the whole art of crop production is a question of manuring. Whitney's investigations on American tobacco, however, led to the recognition that the type of the soil is an important factor in crop production, which has had some extremely interesting developments. Mechanical analyses to determine the tube became an indispensable part of the routine of soil analysis. The perspective was restored, and the fact emphasised that the plant not only wants food, but also proper water supply, air supply, and temperature.

Now there is a very simple rule that applies to all these factors. Plant growth increases with increasing supply of any one of them, but this only happens so long as the supply of every other factor is adequate. When anything is lacking the increase in growth is not kept up and additional supplies give no extra crop. Finally a stage is reached when extra supplies may do harm, either by direct injury or by cutting out another indispensable substance.

Problems of soil fertility generally have to be approached from this point of view. Whenever a case of infertility has to be studied the first question to settle is: What is the limiting factor? And the next: How can this limiting factor be put out of action? As a rule the limiting factor is one of the following:

Limiting factor	Put out of action by:
Wetness	Drainage liming
Dryness	Irrigation, suitable cultivations
	Addition of organic matter
Lack of temperature	Drainage and cultivation
Sourness of acidity	Liming or chalking.

The removal although simple in principle, may be very difficult in practice; it has often proved to be the rock on which many beautiful schemes for increasing food production have been wrecked.

We have seen that, broadly speaking, three general principles of crop production can be laid down:—

(1). The plant must have a sufficient supply of all necessary nutrients, especially of nitrogen, potassium, and phosphorus.

(2). The biochemical decompositions in the soil must proceed smoothly and quickly.

(3). All the requirements of the plant must be satisfied. Any one left unsatisfied constitutes a limiting factor preventing further growth. Increases in any one factor give increases in growth until something else proves insufficient and becomes a limiting factor.

We go back, then, to our three established principles. Each of these can be recognised broadly in every case of crop production, but considerable difficulties arise when one tries to develop any of them; there are so many factors involved and their interaction is so complex. I can best illustrate this by taking one of the factors in some detail, and I will choose one that has received very much attention from chemists, namely, the supply of phosphates.

Phosphates are indispensable for plant growth, and well conducted physiological experiments in sand have shown a simple connection expressible by a mathematical equation between the amount of phosphate supplied and the amount of growth. But such simple results are never attained in soil. At first sight it looks easy enough to take account of this, and simply add it on as a constant in the equation. It has proved almost impossible, however, to give any precise value to the amount of phosphate in the soil that is of any use to the plant. Ville showed years ago that the amounts revealed by chemical analysis are far beyond anything the

plant can ever get, and he rather gloomily concluded that "chemistry is powerless to throw light on the chemical properties of the soil." One could scarcely expect chemists to acquiesce in that view, nor did they. Instead of using strong acids, they used dilute acids; several were suggested, and by a happy inspiration Bernard Dyer selected 1 per cent. citric acid as being the most suitable; although that was twenty-one years ago, 1 per cent. citric acid still holds the field in this country.

The part extracted by dilute acids was called the "available" portion to distinguish it from the "unavailable." The new method at once proved very helpful; difficulties, however, began to arise. It was found impossible to assign any definite value to the amount of available phosphate present. Variations in the conditions of the experiment gave wholly different values for the amount of "available" phosphate, whilst in the case of nitric acid the longer the acid acted the less phosphoric oxide ($P_2 O_5$) was extracted.

Now that gave the clue to the problem. It is obvious that there must be two actions going on; a direct solvent action and a reverse action, resulting in the withdrawal from the solution of the dissolved phosphoric oxide. The direct solvent action was found to be much the same for all dilute acids.

The reverse action proved to be the ordinary adsorption isotherm, similar in type to that obtained with charcoal and dilute acids. The constants are not the same for the different acids, and from these curves it is possible to go back and explain the apparently erratic action of the different acids on the soil.

Thus it appears that when phosphate is added to the soil for the purpose of increasing the growth of a crop it does not simply stop in the soil, waiting for the plant to take it up. It reacts with the soil; it is adsorbed, and the amount available for the plant at any time depends on the adsorption relationships. There is, in short, a competition between the plant and the soil for the phosphate. The curves for clay and sandy soils show that adsorption is greater for clay than for sand; in other words, the clay competes for the phosphate more vigorously than does the sand. An amount, therefore, which is sufficient for the plant growing in a sandy soil proves inadequate on a clay soil. This has thrown light on an interesting problem in manuring, for it has long been known that clay soils stood in more need of phosphatic manures than sands. The field results bring out this fact: the yield of barley on the heavy Rothamsted soil falls when phosphates are omitted, but it does not react nearly so quickly on the Woburn sand.

It seems a far cry from the logarithmic curve expressing an adsorption isotherm to the management of barley and turnips, but the connection is really simple and direct.

This, however, does not settle the matter. The plant is a living thing and consequently its requirements are not rigidly constant, but vary with the conditions. There are very good grounds for supposing that the plant actually requires more phosphate on a clay soil than on a sand. The effects produced by phosphates are promotion of early growth, root development, and early ripening; they are specially valuable on clay soils, in wet regions, and for shallow rooting and quick growing plants, for example, swedes, and turnips.

It is possible that some simple connection underlies all these, but no one has yet discovered it.

Again, seeing that the need varies with the conditions, it is clear that if the conditions are altered the needs may change. When, for instance, a dressing of farmyard manure is applied, some of the properties of the soil are altered; it becomes more porous and more retentive of water, and phosphates may behave differently from what they did before. That is well shown on the Saxmundham plots.

It is unnecessary to go any further. The point I want to bring out is that the simple and incontrovertible statement that phosphates increase plant growth proves very complex when applied in practice. So it is with the other factors. They can be disentangled and investigated, but it is not yet possible to put them together again and predict the resultant. One cannot set out from first principles and reconstruct the normal case of crop production; the factors are too numerous and too complex.

Yet something has got to be done. The technical chemist has the advantage over his colleague in the purely scientific laboratory that he cannot shelve an inconvenient problem. A method has been evolved, an empirical method, which, whilst not very rigid, has at least the merit that it works. It consists in going into the field and finding out the actual agricultural properties of the soil by observations, inquiries, and direct field experiments; these have to be repeated for two or three years because the first results may only have been a trick of the weather, but if the same result is obtained for several seasons running, one may be sure of being right.

All that is old; it is, of course, Ville's method over again. The new part consists in trying to extend the results to other soils. For this purpose a soil survey of the area, usually the county, is arranged. In this way a collection is made on one hand of the agricultural properties, on the other of the chemical, bacteriological, and physical data, of typical soils. It is obvious that the possession of these standard soils helps the analyst and expert adviser very considerably; if a farmer asks for information it is much easier and safer to compare his soil with the standard than to attempt any absolute measurements. Moreover, these soil surveys are greatly facilitating advisory and analytical work.

They do far more than that, however. The normal case of crop production can never be decided on purely laboratory methods because there are always two or three varying factors, whereas in the ideal laboratory experiment there is only one factor varying. We are not, however, confined to the ordinary laboratory methods. Statisticians have to deal with problems involving two or three variables, and they have worked out a method—the method of correlation—which, when intelligently applied, gives valuable results. It is hoped to apply this to crop production. The necessary masses of data are slowly being accumulated, and it is anticipated that very interesting results will be obtained.

The ordinary laboratory method, however—the one factor method—may still on occasions work satisfactorily. It sometimes happens in nature that one of the various interacting factors overshadows all the rest and virtually eliminates them, so that here, too, it is possible to apply laboratory methods with satisfactory results.

For example, on a certain type of clay soil the whole situation is controlled by the circumstance that phosphates are almost absent, whilst the need of the plant for phosphates is particularly great. The addition of basic slag in these circumstances has caused most remarkable improvement. The best instances are seen at Cockle Park, and the results are given in their bulletins.

Another illustration is furnished by our work on the partial sterilisation of soils. The simplest explanation of the phenomena is that the soil population can roughly be divided into two groups ; one favourable to the production of plant food, the other not. The useful population is, on the whole, more resistant to adverse circumstances than the harmful organisms, and therefore survives more drastic treatment. Hence any method that kills some, but not all, of the soil population effects an improvement and leads to good results. A continued spell of favourable condition, however, enables the harmful organisms to establish some sort of superiority. This hypothesis throws important light on the behaviour of the soil in natural conditions, and it reveals another factor in crop production.

We have not yet succeeded in making much of it in the normal case ; indeed, we have scarcely attempted to do so, because there are so many interacting factors. There are, however, cases where this one factor largely dominates the situation. In glasshouses run at a high pitch, where the soil temperature and water content are high, and where large dressings of organic manures are used, the bacterial efficiency falls off so much that the plants begin to suffer. The soil, in the picturesque language of the practical man, is said to become "sick." This sickness proved so difficult to deal with in practice that the soil was thrown out and new soil brought in to take its place.

It was not difficult, however, to suggest a remedy. The reduction of bacterial activity seemed clearly due to an excessive development of the detrimental organisms. It was only necessary to adopt partial sterilisation to get rid of these and to give the useful organisms a better chance of action. The basis of a suitable method was already in existence ; steam had been used to kill insect pests in the houses, and by suitable modification this process was successfully used for the treatment of sick soils.

The most fruitful ideas for working out the development of our subject have often been got from abnormal cases brought in by the growers. Practical men have the great advantage that they are compelled to keep their eyes open for nature's problems ; they cannot shirk them, or they find their crops suffering and themselves losing money. The close association of science with an industry is, therefore, a great advantage, because it brings in new problems, which, if properly investigated, may prove extremely valuable in opening up new fields of knowledge. There is an exhilarating freshness about all this work that one often misses in the more academic investigation.

All the same, while speaking in praise of applied science, one must recognise that science cannot be applied until it is developed. We have seen, and instances might have been multiplied, how the hydrolysis of protein throws light on the proper management of a manure heap, and how the adsorption isotherm worked out for charcoal and dilute acids clears up a difficulty in the manuring of turnips. It is impossible to set any limit to the value of good work in science honestly carried out. The fact is that science and creative industry are one and indivisible, and any attempt to divorce them may only end in disaster.

SOIL.

Nature's Cycle in the Soil.

The following summary of Dr. Russell's second lecture delivered before the Royal Institution on the 7th March 1916 is reproduced from the *Gardeners' Chronicle*. The title of the lecture was "Man's Control."

Nature's cycle consists in two parts: the up grade, being the accumulation of plant residues or organic matter in the soil, and the down grade, being the decomposition of these residues with liberation of more plant food; the former causes the storage of fertility in the soil, the latter causes its liberation.

Control may take place in two directions; the amount of organic matter—*i.e.*, the raw material out of which the plant food is made may be increased; or the pace of the manufacturing process may be forced.

The necessity for increasing the stock of organic matter in the soil was realised very early in the history of the world. Arable farmers found that land cannot be cropped indefinitely; sooner or later it became "exhausted"; it recovered, however, if left to itself for a time, so that natural vegetation could spring up and die down again. The Mosaic law commanded the Jews to leave their land untilled for one year in seven, and not to reap "that which groweth of its own accord." The system survived in our own land through Saxon and mediaeval times: the land was uncropped one year in three, two corn crops were taken, then grass was allowed to grow up on the stubbles, some of which was grazed and the rest ploughed in. The principle still underlies our modern rotations: crops are grown, then the land is left covered with vegetation, but the process is regulated by sowing a definite mixture of grass and Clover chosen to make vigorous growth, instead of leaving the matter entirely to chance.

Another method for increasing the amount of organic matter in the soil consists in growing a crop exclusively for the purpose of ploughing it in. This also goes back to ancient times: Theophrastus, 300 years before Christ, tells us that Beans were grown in Macedonia and Thessaly to be ploughed in at flowering time; and Varro, about 50 B. C. states that Lupins were grown for the same purpose. This method is called "green manuring," and even to-day it is not as fully developed as it ought to be. Instead of ploughing in the crop, it may be fed to animals on the ground, there are other methods also, but the object is always the same.

The cultivator's aim, however, is not to accumulate fertility, but to use it. We must therefore turn to the other part of the cycle, and see how far the down grade can be controlled. The most obvious method is to try to control the soil organisms. This has proved a very difficult problem, and only the fringe has yet been touched. Soon after bacteriologists had picked out the organisms that cause Clover to fix nitrogen, they conceived the idea of breeding them in quantity and putting them on the seed or into the soil. It was thought that by thus reinforcing the organisms already present it would be possible to get much better Clover crops, and therefore a greater store of fertility. These hopes were disappointed. Inoculation succeeded only in one case: when a new leguminous crop was introduced it sometimes proved the more economical to add the proper strain of organisms than to wait till the native organisms had time to adapt themselves to the new crop. This not uncommonly occurs in Canada and the United States, but it is a comparatively rare event here. The proper bacteria usually seem to be present, and little is gained by adding to their numbers, as they merely die

down to the proper number the soil can carry. If one wishes to increase the number, the only way to do it is to improve the soil conditions. But even this does not settle the matter, for, as has already been shown, the soil population is very mixed, and improvements in soil conditions may benefit the whole crowd, good and bad. Indeed, under specially intense glasshouse conditions, the harmful population may prosper so much that the efficiency of the soil becomes lowered and the soil becomes "sick." The remedy is obvious; it consists in improving the soil population, and this is done by taking advantage of the fact that the harmful organisms are more easily killed than the useful ones. Steam is used successfully in glasshouses: antiseptics would be cheaper, but, in spite of considerable search, nothing has yet been found suitable for field work. The problem is still under investigation.

It is extremely difficult to light on any wholly new practice in agriculture, and partial sterilisation is no exception. Long before the dawn of history peasants were heating their soils to get increased yields. The practice is referred to in the ancient literature of India, and by Vergil in the Georgics, and it can be seen in many countries, old and new.

More success has been attained in the efforts to control the soil conditions. Fortunately, these are the same for organisms as for plants, so that anything benefiting the one is likely to benefit the other as well. But there is one fundamental law that always holds: the plant must have every one of its requirements satisfied, or it will fail: for example, no amount of water or food makes up for lack of temperature. Anything setting a limit beyond which growth will not go is called a limiting factor. Common limiting factors in the soil are sourness, wetness, dryness, poverty and thinness of soil. In soil fertility problems the first step is always to discover the limiting factor, and then to put it out of action.

One of the commonest defects is sourness or lack of lime. From the dawn of history this had been one of the problems of the Celtic tribes, who, however, succeeded in discovering a remedy, for Pliny tells us that they drew chalk out of the earth to nourish the soil. To this day the process is still carried out in Hertfordshire much as he describes it. In modern times the use of ground lime has proved more convenient, and ground limestone sometimes even better still.

Wetness can be remedied only in one way—by drainage. This is an old art that was forgotten for a long time; it is not mentioned in the great English Agricultural Revival of the 16th century. Gervase Markham, for instance, wrote books on every branch of farming—so many, indeed, that his publishers made a contract with him to write no more—but never one on drainage. By the middle of the 17th century it was well known, though not much practised: by the middle of the 19th century, however, it was extensively carried out. Much of it wants re-doing. Pipe drainage is out of the question now-a-days on any large area, but a cheap and effective substitute seems to be forthcoming in mole drainage, which consists in making tunnels through the soil about 9 to 18 inches below the surface with a special form of plough. Steam traction is usually needed, and the process only works in large fields, but it appears to be very successful.

Dryness can be overcome either by adding water, as in the big irrigation schemes, or by taking more care of the natural water supply. Addition of clay or organic matter reduces the loss of water: so also does the preservation of a fine soil mulch on the surface. Implements have been devised to produce this soil-layer. Much can be done also by selecting suitable

crops or varieties: special drought-resisting Wheats have been bred in Australia, and Maize in the Western States of America. In consequence of these soil and crop improvements dryness no longer presents insuperable difficulties to cultivation.

Shallowness of soil is, however, more serious, especially when the thin soil is underlain by gravel or very coarse sand; indeed, in this case no one has yet evolved any satisfactory method of treatment for crop production. Something may be done if a soft rock lies beneath, and especially if it is only a thin layer which can be removed. But when all is said and done, there remain great areas of waste land that we do not know how to deal with on our present methods.

Apart from these cases, however, a very considerable degree of control of the soil cycle is possible. The question naturally arises: how far can the process go? Not indefinitely. In any scheme of improvement we are soon brought up against the fundamental law that plants must have all their requirements fulfilled, and anything lacking sets a limit to their growth. Agricultural investigators aspire to a good deal in the way of control and improvement, but there is one thing they admit they cannot overcome—the weather. Here, then, is one limiting factor which has wrecked many schemes of soil improvement, and is likely to remain with us.

Another limiting factor is the soil type. In spite of all efforts a clay remains a clay, and a sand remains a sand. A gardener on a sandy soil may with great pains be able to grow clay-soil plants, but they will never "do" as well as if equal care were bestowed on them in their natural habitat. The farmer cannot lavish care on individual plants, but has to deal with masses. He therefore is less able to overcome the difficulties of unsuitable soil type.

All the same it is imperative that further control should be obtained. It is impossible to tell how and when human progress will be made, but all experience teaches this: that progress is most certain when it is based on a foundation of scientific principle.

CORRESPONDENCE.

THE EDITOR,

Planters' Chronicle.

Dear Sir,—*Re.* the U. P. A. S. I,. Labour Department I would ask through your columns for the sake of airing the questions generally if the Department is not strong enough to *insist* (when advances are made through the Departmental Agency) on ALWAYS being supplied with *the Agreements* made by Writer and Maistries with their coolies. If this were *compulsory* surely things would be much easier for the Deparment in the way of doing away to a great extent with personal and other Securities (I've lost a man this year, in every other way suitable, but he couldn't find Security.) So far as my experience goes, and I can learn, to ask your writer for such Agreement is looked upon as an insult, and in fact *unpardonable.*

As I've not the smallest idea how much money? or proportion of advances actually goes through the Agency of the Labour Department, I can't gauge the value of my suggestion. It is no good for one Association to insist and not all: let me plead for Unity—that Unity that as yet is keeping up advances, if no worse.

I am, dear Sir,
Yours faithfully,
H. W. RAIKES.

SCIENTIFIC DEPARTMENT, U P. A. S. I.

Scale of Fees for analysis in the Bangalore Laboratory.

A.—SOILS.

		Rs.
1.	Complete Chemical Analysis, including the available Potash and Phosphoric Acid	...40
2.	Mechanical Analysis	...10
3.	Complete Chemical and Mechanical Analysis ...	...50
4.	Calcium carbonate and oxide content	...10

B.—FERTILISERS.

1.	Potash in Potassic Fertilisers	8
2.	Phosphoric acid, total and citrate soluble, in Phosphatic Fertilisers	8
3.	Organic Matter, Insoluble Matter, and Nitrogen in Poonacs, &c.	6
4.	Organic Matter, Insoluble Matter, Nitrogen, and Phosphoric acid in Bones, Fish, &c.	8
5.	Complete Analysis of Fertilisers such as Composts, Cattle manures, &c.	...20
6.	Complete Analysis of Lime, Limestones, and Slaked Lime	...10

Half the above rates will be charged to all Members of District Planters' Associations.

For methods of taking samples of Soils and Fertilisers and the quantities to send for analysis see *Planters' Chronicle* Volume X. pages 207 and 216.

All samples for analysis should be sent plainly labelled to "The Planting Expert, 25, South Parade, Bangalore," and should be accompanied by a covering letter giving full information about the sample and the analysis desired according to the above table. Fees should be remitted to "The Secretary of the United Planters' Association of South India, 25, South Parade, Bangalore."

The Planters' Chronicle.

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THE U. P. A. S. I.

(INCORPORATED.)

Contents.

R. D. A. contributes an article on Markets, Prices and Statistics.

We publish from Simmons Spice Mill an article on Chicory—a Franco-Belgian Industry stopped by the war—by Jacques Boyer.

H. P. contributes an experience of his own at Perim in connection with Mocha Coffee, which will be read with interest by all Coffee planters in Southern India.

At the request of some of our readers we re-publish a chapter from the late Mr. Pringle's pamphlet entitled "Science and Coffee." We believe the book is out of print and hard to procure, but it was well worth reading especially by Coorg planters, amongst whom the late Mr. Pringle lived and worked.

A suggestion is put forword by AX in our correspondence columns, and we hope will meet with support from planters in the Hills who have a room at their disposal.

An informal conference took place on Saturday, at Government House, Ootacamund, between the members of the Madras Government and the Resident in Mysore, the Dewan of Mysore and the Commissioner for Coorg, at which the subject for discussion was schemes of railway development for connecting the Government railway system with the Mysore State Railway, and for opening a railway line through Coorg, joining on to the Mysore State Railway and the Government railway system.

SOUTH INDIA PLANTERS' WAR FUND.

	Rs.	A.	P.
Amount previously acknowledged	44,427	4	8
Mr. V. L. Travers Drapes	10	0	0
Messrs. Barber and Pascoe	75	0	0
West End Hotel Billiard Room	5	0	0
Mr. Stephen Bayly	10	0	0
Mr. J. Stuart	150	0	0
Total Rs...	44,677	4	8

OVERSEAS AIR CRAFT FUND.

Balance	95	0	0

MARKETS, PRICES, AND STATISTICS.

Coffee.

Auctions were resumed on the 2nd May. Offerings of East Indians have been fairly heavy—6,364 bags—but the demand has been good and prices very steady for everything except the bold sizes, which feel the duty more than the lower grades.

Tea.

The market reopened on 1st May with a strong demand at prices ranging from ½*d.* to 1*d.* over those ruling before Easter, common kinds being particularly strong.

The following prices were fetched for South Indian teas:—

—	O.P.	B.O.P.	Pek. 1.	Pek. 2.	B. P.	P. S.	P. F.	B. T.
Travancore.								
Vembanard ...	...	1/1	14¾	...	1/-	...	...	...
White Hills ...	...	1/-½	11½	...	1/-	...	...	...
Glenmary ...	...	...	...	...	1/-½	...	...	...
Woodlands ...	...	...	11¾	...	1/-¼	11½	...	...
Stagbrook ...	...	1/1	1/-¼	...	1/-½	...	...	...
Ladrum ...	...	1/1	1/-½	...	...	11¾	...	11¾
Munaar ...	1/1¾	...	...	...	1/1½	...	...	...
Periavuirai ...	...	...	...	...	1/1½	...	1/1¼	...
Fairfield ...	...	1/-¼	11¾	...	1/-	...	...	...
Pambanar ...	...	...	11¾	...	1/-¼	...	...	...
Bon Ami ...	...	1/-½	1/-	...	...	...	...	...
Kolie Kanum ...	...	...	1/-	...	1/-½	...	...	...
Nilgiris.								
Curzon ...	...	1/-¾	1/1½	1/-¾	...	...	...	...
Davera Shola ...	...	1/2	...	...	...	...	...	...
Barwood ...	...	1/1¼	1/-	11¾	...	...	...	...
Prospect ...	1/1¾	1/2	1/1½	...	1/-¼	...	...	...
Seaforth ...	...	1/1	1/-¼	...	1/-¾	...	...	...
Rob Roy ...	1/-½	1/1	11¾	...	1/-½	...	...	...

Rubber.

There have been fairly heavy supplies and difficulties in getting permits for America. This combined with the fact that the Government has taken up all the Archangel tonnage, caused a sharp drop although there was a considerable amount of buying going on for home consumption. From last report till 3rd May prices fell from 3/1 for crepe and 3/-½ for smoked sheet to 2/8¾ and 2/8. On 4th May there was a recovery of about 1*d.*

South Indian sales include the following:—

—	Smoked sheet.	Brown crepe.	Scrap.
Kerala ...	3/-¾	—	2/6½
Kutikal ...	2/11½	2/10¼	—

The following quantities of Rubber were imported into England during the month of March, in centals of 100 lbs.

	1916.	1915.
From Dutch East Indies ...	4,758'	—
„ French West Africa ...	4,479'	1,483'
„ Gold Coast ...	1,524'	454'
„ Other countries in Africa ...	9,557'	4,292'
„ Peru ...	355'	5,137'
„ Brazil ...	25,183'	42,705'
„ British India ...	3,928'	3,266'
„ Straits Settlements ...	61,884'	81,096'
„ Federated Malay States ...	21,642'	27,958'
„ Ceylon ...	27,020'	45,631'
„ Other Countries ...	2,530'	6,292'
Total Imports...	162,860' centals.	223,942' centals.

The following quantities were re-exported during the month of March, in Centals of 100 lbs.

	1916.	1915.
To Russia ...	13,978'	12,642'
To France ...	16,764'	10,277'
To United States ...	45,447'	110,756'
To Other Countries ...	18,155'	17,013'
Total Re-exports...	94,344' centals.	150,688' centals.

Statistics.

In our last issue we gave the figures of acreage under different crops in the Madras Presidency and Coorg during 1913-14. The official returns for 1914-15 have just come to hand and the following figures may be of interest to planters in Southern India.

	Madras.	Coorg.
	acres.	
Rice ...	10,875,909	81,895
Ragi ...	2,432,370	3,440
Total Food Grains ...	30,390,120	86,977
Total Oilseeds ...	3,388,452	354
Sugar Cane ...	74,463	19
Cotton ...	2,087,442	3
Total Fibres ...	2,426,064	158
Tea ...	27,060	100
Coffee ...	44,085	42,495
Net area cropped ...	34,691,788	138,691

R. D. A.

CHICORY.

The Manufacture of Chicory in France.

A Franco-Belgian Industry stopped by the War.

By

Jacques Boyer.

The war has paralyzed the industrial activity in Belgium and northern France. A great number of factories were sacked, destroyed or removed by the Kaiser's hordes. The copper apparatus of the sugar factories and refineries of the Aisne, of Pas-de-Calais or of the Ardennes, such as vats, stills, rectifying columns of the breweries of the north or the alcohol distilleries of the Somme were sent to the arms factories beyond the Rhine in order to be converted into cartridges, shells or other destructive projectiles. The coal taken from the mines of Charleroi, Bethune, Lens or Bruay is going to join in Germany the wool taken from Tourcoing and Roubaix. But the manufacture of chicory is one of the industries which has suffered most from the present struggle, owing to the fact that the fields where this plant was cultivated, as well as the factories in which its roots were converted into a coffee substitute, are located on Belgian territory or in the French departments now invaded. We shall therefore, devote a short study to this merchandise, which has almost entirely disappeared from the market.

Chicory is cultivated on a large scale chiefly in the departments of the north, Pas-de-Calais, Oise, the Ardennes and in Belgium. In France alone the area of the fields sown with this plant is said to exceed 8,000 hectars, according to the information kindly given us by Alphonse Leroux, a specialist on this subject.

The argillaceous-silicious or argillaceous-calcareous soils, when thick and slightly fresh, are perfectly adapted for this plant, and particularly our rural districts from the Belgian border to Calais form a region very advantageous in this respect.

For the preparation of the soil, after the removal of the preceding harvest, the weed-extirpator is run over the field two or three times at intervals of eight days. By this digging operation the clogging plants are destroyed, after which the manure and the fertiliser are incorporated with the soil by deep ploughing. The field then during the whole winter is exposed to the influence of the atmospheric agents In spring the soil is mellowed and sodium nitrate, superphosphate and potassium chloride are spread upon its surface. After this the sowing is done, which in France is performed in the second half of April or, better, from the 5th to the 25th of May. Two principal varieties of coffee chicory are recognised: the *tete d'anguille* or *Palingkop*, with curled leaves and the improved *Magdeburg*. As pointed out by J. van Seynhaeve, professor at the Agricultural Institute St. Jeane Berchmans at Avelghem (Belgium), these two varieties, by hybridization, have yielded a great number of sub-varieties possessing agricultural and industrial properties more or less appreciated according to locality. The Palingkop variety is characterised by its regular root, its serrated leaves and red-coloured ribs of the latter. It is preferred by Belgian growers, although its gross yield is less than of the Madgeburg variety; this is counterbalanced by the fact that it dries more readily and that it yields a highly appreciated manufactured product. Moreover, on malting, the Magdeburg variety undergoes a more considerable reduction of weight, its husks maintaining a whitish tint even after roasting; for this reason its roots are sold at a price 10 per cent. lower than those of the Palingkop variety. In spite of this, it is cultivated by the majority of the

French growers, whereas in Germany the variety encountered most frequently is the Brunswick chicory or sugar-beet chicory having deeply serrated and curled leaves approaching the Tete d'Anguille variety. It is suitable for less deep soils or soils with mediocre sub-soil.

Whichever variety is selected, the seed is generally sown in lines, about 3 to 5 kilogrammes per hectar, by means of a special sowing machine, and is covered by harrowing and completely buried by passing a roller over the field.

Eight or ten days after sowing the seed sprouts, and as soon as the cotyledonous leaves appear the weeds are picked either by hand or by means of a horse-drawn weeder. A few days later, when the fourth leaf is open, the thinning out begins, followed a little later by transplanting, by setting the stalks from 16 to 30 centimetres apart in the lines. Hoeing is done a number of times as long as the vegetation permits of walking between the lines, since a well-cared-for soil exerts a great influence upon the growing of the roots. In addition to this, the plants which show woody husks are discarded, since they depreciate the product.

In France, the chicory is harvested from September 25th to November 25th, either by hand or by ploughing. As fast as the plants in one line are pulled, the roots are gathered in heaps, after the removal of the leaves, and are roughly cleansed.

They are then transported to the factories, where they are dumped in heaps over little canals covered with small wooden screens. There they are stored until subjected to further treatment. Then the workmen need only to remove the screens and rake the roots into the canals, which serve as a hydraulic conveyor, as in sugar refineries.

By that method the chicory roots are partly freed from adhering earth and arrive at the end of an endless screw, which delivers them to the washer. At the top of this screw elevator the roots fall into a sheet-iron vat provided with a perforated bottom. In this vat is a shaft provided with arms, which agitate the roots in the constantly renewed water. The sludge passes through the holes in the bottom and is tapped off through a drain closed by a slide-valve.

From the washer the roots are dumped on to a shaking table, likewise provided with a perforated bottom, where they are drained while travelling toward a bucket-chain which conveys them to an upper floor. There an inclined chute delivers them to two root-cutters, from which the roots, cut into small pieces, are conveyed to the malt-kilns. These special driers have either one, two or three compartments. In the latter case the chicory is first spread over the perforated floor of the upper compartment of the malt-kiln, where it remains for about 12 hours, after which it is pushed down through trapdoors to the second compartment, where it remains for the same length of time, after which it is dropped by a similar arrangement to the first or lowest compartment, where the drying process is completed and whence, after cooling, it is collected in bags.

Then the roasted chicory undergoes various operations. These agricultural factories generally possess from 6 to 18 kilns. Each kiln will dry 3,000 to 3,500 kilos of green roots daily. Thus in order to supply the cutting plant of Alphonse Leroux of Fretin (Nord), which comprises three batteries of 6 kilns each, normally fired during three months, 200 hectars of chicory plants are required, each hectar on an average yielding 30,000 kilogrammes.

The double roasting furnaces of Conflant shown in the accompanying photograph are built with two fire-grates and four spheres capable of roasting 3,000 kilogrammes per day. Two spheres rotate during the roasting

operation while the other two are cooling down. The driving mechanism is sufficient for rotating three batteries of four spheres each by a single belt. As has been shown by Camille Guyot, in his highly informing book on chicory (1911), the operation is usually finished in the cold, *i.e.*, the apparatus is withdrawn from above the grate and is allowed to rotate for a certain time. Prior to and during the roasting operation, fatty substances are added which, besides giving a lustre, reduce the bitterness.

After cooling down, the chicory having become friable and brittle, passes into a series of crushers. After each crushing operation the broken material is passed through a selective sieve-drum and sifters adapted to divide the material into four sizes. These 6 million kilogrammes of roots, after drying, yield about 1,500,000 kilogrammes of dried chicory.

From these drying plants the chopped material is brought in bags or in bulk to the manufacturer whose first care is the cleansing of the material. At the roasting plant of Orchies (Nord), for instance, it is dumped into compartments provided with shakers, and thence to a powerful aspirator which removes the bits of straw, dust, etc.; thence it drops into a bolting-mill, where it is freed from the heavier sand and assorted according to size. The finer pieces serve for the manufacture of the ordinary brands of chicory. The larger particles are used for the high-grade brands.

This operation is followed by roasting, which is done in sheet-iron spheres of one meter diameter revolving above fire-grates heated by coke.

Finally the roasted grains undergo a last manipulation, viz., the tinting, which consists in giving the grains a coating of impalpable chicory dust which imparts to them a regular tint and reduces their hygroscopic power by closing the pores. The method used for effecting the tinting vary considerably, but the most widely used consists in reducing the residues left after crushing to a fine powder by means of granite cylinders revolving in a pan. On issuing from the cylinders the tinting powder is sifted and mixed in the proportion of 15 per cent. to 20 per cent. to the roasted material, after which the material is again sifted. The chicory is thus given the aspect of a perfectly coated light-coloured grain entirely freed from an excess of dust. The last operation is that of packing the chicory either by hand or by machinery.

Since the war began chicory has been replaced by various products, among others the sweet acorn manufactured from the fruits of several oak varieties of southern France, or by malt (germinated cereals, particularly barley which is roasted), or else by the fig coffee. For the production of the last-mentioned competitor of Mocha coffee, the figs of Smyrna or Corfu are cut into pieces either by hand or by a kind of chaff-cutter. The fragments are then dried upon hurdles and then roasted in a special kiln having its lower portion built in stone, and covered by an iron plate upon which is placed a rack provided with a conveying mechanism. Upon this rack, likewise built of metal, are placed 18 hurdles formed of frames of a hard wood over which is stretched a wire net upon which are spread about 5 to 6 kilogrammes of figs.

The hurdles, loaded one after the other, are inserted in place, starting at the top of the apparatus. When all are in place, the heat is brought up to 170 deg. Cent. During evaporation, which lasts from 2 to 3 hours, the operator withdraws successively each of the hurdles and mixes the figs by means of a hook. The only operation remaining now consists in grinding the roasted figs, which are then sold as coffee substitute possessing "sedative and fortifying properties," according to the opinion of grocers of France who, in default of anything better, sell it to-day to the dealers in "petit noir" for two cents.—*Simmons' Spice Mill.*

MOCHA COFFEE.

(*Contributed.*)

Looking over back numbers of the *Chronicle* I have come across a brief account of Mocha Coffee taken from the *Tea and Coffee Journal of New York*, in which it is stated that this "is an absolutely *unique* product with a flavour and aroma quite distinct from the Abyssinian variety," and at the close, a statement of the percentage of this coffee taken by the principal importing countries is given, putting the total average crop at 1,00,000 bags of 160 lbs. or, say, 7,143 tons.

As to how much of this "genuine Mocha" is grown in the country has always been a matter of opinion, as planters at any rate are well aware that year by year a large number of Arabs attend the West Coast Coffee Markets, and take away a considerable quantity of "whole crop" coffee of which they are keen buyers: so the following experience may interest your readers.

In 1905 I was going home on the Anchor Line, and, for one of those occult reasons known only to skippers: the steamer decided quite unexpectedly to coal at Perim instead of carrying on to Port Said. As I was anxious to write and post letters for India I did not go ashore with my fellow passengers. On their return one lady held up a large bag and called out "I've been buying Mocha coffee. Much better than yours." I replied "It's probably my sweepings for which you've paid double." I then asked her to let me look at it to see if it resembled our 'Native,' but this she was unwilling to do, as it was neatly and mysteriously packed in palm leaves. Anxious to see the stuff, and it being late and risky to go ashore myself, I asked the coaling agent, the representative of a well-known Bombay firm, to send his peon to get me a similar small bag, telling him my reason. As time was insufficient his man was not able to return before the steamer left, but the Agent, while waiting, remarked "You will probably only get your own coffee! It is a regular business with these Arabs. They leave here in their dhows about November for the Malabar Coast and return with coffee and other cargo about March. And you can see them here on this quay unloading the coffee from gunnies and repacking it in leaves like the parcel you've seen and sending it to Aden for shipment." I asked if they mixed it with their own Mocha grown coffee; but of this he was doubtful, and did not think "they bothered," confining themselves to the typical packing only as sufficient guarantees for the "genuine" article.

I wish I could have verified this personally, but I give the statement as it was given me; but may add this agent told me he knew the Malabar Coast personally.

As to the "distinct flavour and aroma" mentioned by *The Tea and Coffee Trade Journal* I presume the Arabs pick their home grown coffee dead ripe, and sun dry it, as "Mocha" coffee is "foxy" to a degree; and I presume every planter knows that the finest coffee he can have for his own drinking, or that of special friends, is fully ripe fruit, sun dried, which has a marked flavour and aroma of its own and is markedly foxy. Unfortunately it takes such a long time to dry and cure! Undoubtedly the quality of "whole crop" coffee is ruled by the higher proportion of ripe berries at the time of picking. And the higher this proportion, so much the more foxiness will be obtained—a fact appreciated by the French. The

producers of "Bassanhalli" coffee, the finest "native" on the market, unfortunately, to suit their labour conditions, often pick their crop too early when the proportion of ripe is low, thereby losing the foxy colour desired by the French and Arab merchants and which is really a hall mark of maturity.

However the fact remains that such coffee is sought after by the Arabs, who would hardly buy it for their own consumption as they could land "Brazil" at lower rates. So I think we may conclude that E. I. "whole crop" coffee is bought by them, as something very similar to their own coffee, for mixing or for sale as "Mocha." But it would be to the advantage of E. I. coffee Planters if the European and American buyers of "Mocha" could be educated to the fact that much of this speciality is produced in India and could be bought directly on the Malabar Coast and thus do away with the Arab middle-man.

It would be interesting if the export department ascertained the amount shipped by Arabs from the Malabar Coast to Arabian ports.

It is noticeable that the United States heads the list of importing countries with 30%. England and Germany coming second with 5%. Is this larger quantity required to tone up the Brazilian product in the American market ?

.H. P.

War on Rats and Mice.

Notwithstanding the many methods of destroying rats, which we published in the February issue of this journal, further advice is asked by a correspondent. We heard last month that an entirely new material has been placed on the market by Messrs. Dalgety and Company, Brisbane, who are the sole agents for Queensland for a liquid named "Ratinol," which, it is claimed, is the best and surest rat-destroyer yet employed. The inventor is Dr. J. Christmas, M.D., of Paris and Copenhagen universities. In consideration of the splendid service his Ratinol has rendered to the French Ministry of Agriculture, the title of Officer of the Legion of Honour was conferred upon him by the French Government. Mr. J. C. Pound, Government Bacteriologist, Queensland, reporting to the Minister of Agriculture on Ratinol as an agent for destroying rats, instances the results of two experiments made by him:—

"*Experiment 1.*—Four healthy rats were fed with pieces of bread on which a little Ratinol was sprinkled. Result: Two rats died on the first day, one on the second day, and one on the fourth day.

"*Experiment 2.*—Thirteen healthy rats were fed with a mixture of bran and pollard with a small quantity of Ratinol added. Result: Four died on the first day, one on the second day, two on the third day, four on the fourth day, and one on the fifth day.

"The results of these experiments show that Ratinol can be used successfully as a means of destroying rats."

Ratinol is harmless to human beings, live-stock, dogs, cats, and birds. Analysts have found no trace of poison in it. Rats and mice eat it greedily. A small bottle of it can be bought for 2*s.*—*Queensland Agricultural Journal.*

THE COFFEE BORER.

This insect is the larva of an elegant beetle generally known as the "fly," from its likeness to a horsefly or wasp. Scientifically it is one of the Coleoptera, of the genus clytus, and is represented in America by the hickory tree borer, and locust tree borer. The generic name Xylotrupes, signifying wood borer, has also been applied to this insect, and if people are not satisfied with Dunnings' name Clytus coffeophagus, I would suggest the name xylotrupes coffea indica, simply meaning coffee borer, India, which leaves the question of suborder and genus open. But planters are very little interested in names, and a beetle which has wrought such havoc, killing off estates in toto, decimating others, and in even those most free from it causing an appreciable loss, is to them the "coffee borer" in its larva state and the "borer fly" when it has developed into a beetle. During my four years' residence in Coorg, I have been collecting statistics of damage done by borer and experimenting with remedical agents. I have been successful beyond anything I hoped for, not only in unravelling the history of the beetle, but also in applying remedies. It is easier to deal with than leaf disease, Hemelia vastatrix. It is possible in from three to five years to reduce the losses of the trees on the estates by treating the trees for leaf disease and borer simultaneously, by from 50 to 75 or 80 per cent. calculated on the present loss. More it is useless to expect, as a great many trees die out from overbearing and other causes. The following is an approximate statement of the trees ripped out, and entered as "Borer" in South Coorg from estates under European management.

Year.	Rainfall inches.	Crop cwt.	Per cent. of trees on acreage.
1885 ...	62·31	5	8·3
1886 ...	57·82	3½	6·9
1887 ...	71·00	4½	7·0
1888 ...	50·66	2½	8·8
1889 ...	65·98	2¾	8·9
1890 ...	50·68	2	8·5

Neither the average crop nor the rainfall appears to have much to do with the borer failure. But when the details are examined, a very close connection is found to exist between the weather and both crop and borer. I cannot in the brief space allowed me fully discuss the meteorological features of the question in this paper, but will just say that when the number of sun spots were at the maximum, the crops were good ; as the number decreased so did the crops ; and as they are now on the increase, crops will probably prove good till the maximum is again passed. For the purposes of this paper we will consider that the average of the various styles of planting give 1,500 trees per acre original. It takes fully three years for supplies amongst old coffee to come into bearing and I would not be far off the mark if I said 50 per cent. fail in South Coorg. However, to carefully understate the case we will suppose all to come on. Then the land out of bearing per acre of cultivated coffee was :—

In 1887 equal to ... 22·2 per cent.
In 1888 „ ... 22·7 „
In 1889 „ ... 24·7 „
In 1890 „ ... 25·2 „

All this is paying taxes, absorbing work and manure, and taking the best energies of our planters to prevent it increasing. The insect was the subject of Government inquiry some years ago, when Dr. Bidie investigated the matter. He, however, had not the opportunity to sit down and work out its life history, or probably his work would have been as complete as that of Marshal Ward in regard to Hemelia vastatrix. In 1887, in the month of May, I obtained my first specimen of beetle, and I soon found that as far as the estates with which I was connected were concerned, it caused greater destruction than leaf disease, in spite of their being under shade. I began a careful study of the life of the insect and, though one or two minor points are still undecided, on the whole its history is fully worked out. In the central district of the Bamboo the beetle appears later than in the hot eastern district, but sooner than on the ghats. My remarks apply to the central district. After the first or second week in June, depending on the monsoon, the beetles disappear. Stragglers are to be found all the year round, but it is not till the end of August that there is any certainty of finding specimens of the autumn flight, and it is well on into April before the spring host appears. The maxima are two, one at the end of May, one at the end of October; the minima occur in January, February and July. To make the influence of the weather on the beetle's development clear, I append a table drawn up from personal observation: —

Month.	Weather.	Temperature.	Beetles.
January	... Dry	... 60° to 99° Fh.	... Very scarce.
February	... ,,	... 50° to 90° ,,	... ,,
March	... Showers ?	... 55° to 90° ,,	... Scarce.
April	... ,,	... 66° to 90° ,,	... Few.
May	... ,,	... 75° to 95° ,,	... Plentiful.
June	... Monsoon	... 60° to 70° ,,	... Few.
July	... ,,	... 60° to 70° ,,	... Very scarce.
August	... ,,	... 70° to 80° ,,	... Scarce.
September	...Heavy showers ?	... 65° to 90° ,,	... Few.
October	... ,,	... 65° to 90° ,,	... Plentiful.
November	... Showers ?	... 70° to 85° ,,	... Very plentiful.
December	... ??	... 55° to 85° ,,	... Few.

Where a note of interrogation follows the weather remark it means that the showers were uncertain. There is occasionally, a much greater variation in the temperature than that given; for instance, in May I have known the thermometer to be over 104° in the shade, and I have in January seen it down to under 40° Fahrenheit. Broadly speaking the temperature represents the averages of the maximum and minimum observations which do not, as a rule, vary in South Coorg more than five or ten degrees from those given. A consideration of the foregoing explains why shade (recommended by Dr. Bidie who saw its good effects on the Polli Betta where it had been planted by Mr. Minchin, who, I am informed, saw its good effect in Munzerabad) is so useful in retarding borer development The mean minimum temperature must not fall below 65° Fah. or the development of the beetle is retarded; and shade by shutting out the sun's rays lowers the temperature. The eggs if kept at a temperature of 36° Fah. for 24 hours are all killed; few resist a temperature of 40°, but if the temperature is maintained at from 80° to 90° almost all the eggs will give forth larvae in about ten days. Hence, when a very dry season

with hot east winds occurs borer failures are more numerous. It is also the reason why borer has been so much worse in the Bamboo districts than in the forest and ghauts, and is the chief reason why shade is neccessary in the hot eastern districts. The beetle when depositing its eggs selects a crack or crevice on the sunny side of the tree and avoids that upon which the monsoon rain beats. Every shower destroys the eggs which have not been so placed that they are kept dry. Shade does great good by retarding the development of the eggs, so giving the trees a greater chance of being freed from them by the rain. To satisfy myself as regards the influence of moisture I conducted a series of experiments on the influence of moisture on the development of the eggs, which I will briefly describe. Twelve borer trees taken out in May were chosen for the experiments; they were as equal as possible in size; the primaries were cut off. No. 1: Four of the stems were placed standing, in a dish with soil up to the old ground level, and on the top of each was placed a pad of wool. The whole was enclosed in a muslin cage which was kept about one foot clean of the tree. No. 2 was the same as No. 1, only the pad of wool was omitted. No. 3 was the same as No. 2. In. Nos. 1 and 2 the soil was kept constantly damp, and in No. 1 the pad of wool also. No. 3 was quite dry. Previous experiments had shown a temperature of 80° to 90° was most favourable to the development of the eggs, and I maintained that temperature as nearly as possible. No 1 was damp all over. No. 2 was damp at the root. No. 3 was dry. A beetle escaped from one of the trees in No. 3 in August, and on the 9th September 1888, I cut up the trees-which were brought in on the 13th May 1888 with the following results:—

	Larva.	Pupa.	Beetle.	Totals.
No. 1	... 20	3	0	23
No. 2	... 63	7	1	71
No. 3	... 191	12	3	206

The average per tree is No. 1, 5·75, No. 2, 17·75, and No. 3, 50 12. This shows that a tree left lying on the ground during the monsoon, when it is kept constantly damp, does not develop many beetles; but such a tree, if left out during the dry weather, will develop almost all the eggs deposited on it. This points to the urgent necessity of burning the trees as soon as they are pulled out.

The greatest number of borer I have found in one tree was as follows; the trees were taken out on the 8th July 1887, and cut up on the 8th September 1887;—60 borer (grubs or larvae), 22 pupae, 1 fly (beetle or imago), or a total of 83 in the trees in various phases of development.

One beetle escaped before I cut it up, so there were altogether 84 borer in that one tree. This tree was kept carefully dry and at an equitable temperature varying from about 65° to 80° Fah. Under favourable circumstances the life history is as follows: The beetle deposits the eggs in a crevice of the bark on the sunny side of the tree; in about ten days the larvae hatch out, but it may require 15° to 20°. The larva works on its sides and cannot advance unless there is a resistence behind, this the newly-hatched insect obtains from a projection or corrugation of the bark; in 24 hours or less the creature is buried under the bark. Once in the tree it advances, compacting the sawdust like the matter it excretes, by admixture with gummy substance, which, aided by the pressure of the insect forcing itself up against the wood it is devouring, becomes almost as hard as the surrounding wood, and fills the tunnel behind the insect.

This work goes on from three to five months, when having reached its full development, the larva having advanced to within about 1¼ inch of the bark, undergoes transformation, entering the pupa stage. In this form it is covered by a thin transparent envelope, and lies with its head towards the bark and the tail towards the centre; it remains in this state till the temperature is suitable, probably about three weeks or a month, when it undergoes its final change into the beetle, which eats its way out. If the larva has not worked near enough to the bark before changing it may fail to escape, it is because there is more wood than it can consume. From egg to beetle the average duration of the individual life is about six months, the majority of the race developing in May and October. As I have already exceeded my limit I must conclude. Though I have omitted a description of the beetle and borer grub, and merely give an outline of the most important facts.

In a subsequent note to the Mail, Mr. Pringle adds:—In the issue of the 9th, in the article "Borer." there are two errors which I would be much obliged to you if you would kindly correct, *viz.* "average per tree in No. 3 is 51·50" (not 50·12) and "the larva having advanced to within about ¼ (one quarter) (not 1¼) inch of the bark." I may say the borer is sometimes found in the stems of trees barely 1 inch in diameter; in these cases there is scarcely one-eighth of an inch between the insect and the outer bark. In the letter signed "Gobra" in the same issue, the writer says he "considers the letters which have appeared on the subject very interesting but rather too theoretical." No doubt, but if theory did not work in front, practice would make but little progress. It is the duty of the technologist to bring theory to the test, and answer the omnipresent question "Will it pay"? That question has followed me from engineering works, through chemical and manure manufactories, to my labours in connection with coffee cultivation. It is a practical question, and men must answer it practically. If the letters have only shown the planters in which direction they can most profitably work at the test questions, they will not have been written in vain. I most heartily endorse the remainder of your correspondent's letter which is very much to the point, and I hope there will be no more of the penny wise and pound foolish policy of starving the estates. Good work and manure produce good results.—*Science and Coffee by the late Mr. William Pringle, M. S. C. I.*

Fermentation of Coffee.

The experiments were carried out at St. Thomas. The writer removed the greater part of the pulp from the coffee beans, and subjected the latter to alcoholic acetic fermentation that raised the temperature to 45° C. Then he exposed them to the action of atmospheric oxygen, and finally thoroughly dried them. While the seeds that had also undergone acetic fermentation assumed a yellowish white colour, and on roasting gave a beverage without aroma, those that had only undergone alcoholic fermentation remained a beautiful green, and made aromatic coffee. In the case of coffee, fermentation besides killing the seeds, has the object of softening that portion of the pulp which still remains adhering to them after the greater part has been removed, and thus facilitating the washing and drying. Fermentation should, however, not be carried too far, for the acids have an injurious effect.—*The Agricultural News.*

CORRESPONDENCE.

24-5-1916.

THE EDITOR,

The Planters' Chronicle.

Dear Sir,—I heard lately—though I cannot say what truth there was in the information—that a number of wounded officers were being billeted on residents in the Nilgiris, while recuperating their health. Probably the accomodation available at Ooty, Coonoor, Kotagiri, &c., is sufficient; but if it is not, would it not be possible for planters in hill districts to assist in a small way? Life on an estate is not of course amusing for an invalid or tea layman even interesting, and in many districts lack of medical aid would be a disadvantage; but for nervous and other cases which only require rest perhaps the suggestion would be feasible. I am quite sure that planters in healthy and suitable districts would be only too glad to give their help if it could be of any use.

Yours faithfully,
AX.

27th May, 1916.

THE EDITOR,

Planters' Chronicle.

Sir,—Mr. Harold Storey's letter which you reprint in the *Chronicle* of 20th May certainly hits the target as far as Ceylon is concerned, but one is tempted to ask whether it does not apply to us also as regards our Tamil labour at least? Have we not been and are we not wading into the mire with our eyes shut? Do we not want our "Augean Stables" cleaned to some extent, too?

Not that we are anyway nearly as deeply in the soup as Ceylon. As far as my small experience goes, the individual Tamil cooly here is free of debt. He gets a small annual advance of Rs.20 or so and works it off annually, being if any good at all able to go to his village every 12 month with a nice, fat Check Roll balance. I do not think the vicious system of collaring coolies' pay against the kangany's personal debt is much in vogue here nor is the kangany allowed to overadvance him. Only so much is given as can be worked off in 12 months.

It is, however, the kangany that fails to score. Why in the name of reason should not both kangany and cooly work under the same system?

Take the case of a Tamil kangany who has been some 10—20 years on (say) a tea estate. He has probably made no profit on his weeding contract, which he has only clung to for the sake of extra rice and stores; 'Bolters' debts have been charged up to him, and what with one thing and another the wretched kangany has become saddled with a personal debt of anything from Rs.500 to over Rs.1,000,

This I venture to maintain is, most emphatically, '*not business.*'

All old longstanding debts in kanganies' own names should be wiped off. Then let each kangany start the year with a clean balance sheet and be treated exactly in the same way as the cooly—*i.e.*, get his credit balance paid yearly. This surely is the only way to keep a man happy and contented and encourage him to be honest, *because* it is *worth while.* If a kangany with no previous mill-stone of debt cannot have a credit at the end of each year, then there must be something very wrong indeed.

The objection will of course be raised that the kangany gets personally into debt because he takes an advance for coolies and fails to bring the agreement number, the difference being put against himself. Well, I can only say that for the last 4 or 5 years, thanks to the existence of a Labour Agency now under the Labour Department which made a point of insisting on each kangany bringing his full number of coolies, I have hardly had a single case of a kangany failing to keep his agreement. But notwithstanding this happy state of affairs, owing to the accumulation of past years' debts, hardly any kangany ever had a personal credit balance. And I do not think that the kangany himself is to be altogether blamed for this—in proof of which I would ask the following questions ?

1. Is it or is it not the case that as far as tea goes, plucking coolies pay is "cut," that the full contract rate of 3 pies a lb. is not given in toto, but kanganies pay and head money, cost of baskets and transports is deducted so as to work to so many cents or annas per lb. ?

2, Can kanganies make decent profit on the weeding contract rates at present in force ? Has not cheapness in working costs been kept more in view in this respect than the kanganies indebtedness ?

3, Why should the same plucking rate be given for each estate irrespective of yield per acre ? 3 pies a lb. at 700 lbs. or at 400—500 lbs. an acre are very different things.

There is no need to multiply instances, but what I wish to show is that all these points affect the kangany equally if not more than the cooly. At a low yield per acre his plucking head money is very little and this coupled with loss on weeding contract and bolted or dead coolies' debts soon puts him and keeps him year after year on the wrong side of the account. In conclusion, I would only say that though things are not nearly so bad here as in Ceylon, Mr. Storey's remarks as to the viciousness of saddling an estate labourer whether cooly or kangany—with a hopeless debt apply with equal force if not in so great a degree to Tamil estate labourers in S. India. For goodness sake do not let us drift anywhere near the Ceylon impasse.

We can only say that our labour position is sound when every kangany as well as cooly shows a credit balance as the result of each year's work : in other words the advance account at the end of every year would be NIL.

Yours faithfully,

"SAMBELLUM."

The Planters' Chronicle.

RECOGNISED AS THE OFFICIAL ORGAN OF THE U. P. A. S. I., INCORPORATED.

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THE U. P. A. S. I.

(INCORPORATED.)

Contents.

The minutes of a general meeting of the Anamalai Planters' Association and those of the West Coast Planters' Association are published.

A precis of a Conference of Coffee Planters held at the office of the U. P. A. is published. It was a very well attended meeting, coffee planters from long distances, at great personal inconvenience came to show their great interest in their industry and to take part in discussing the best methods of improving it.

We venture to think that the statement of acreages of coffee under cultivation in Southern India will be an eye opener to the allied industries of Tea and Rubber. Two conclusions were arrived at which we hope will attract attention and fill our correspondence columns with criticisms, favourable or adverse.

"R. D. A." contributes an article on Markets Prices and Statistics. We think that if an average column were added to the coffee lists, it would add to the interest of the sales.

Our Correspondence Columns are fuller than usual which we trust is of happy augury for the future.

The following Order has just been received from the Acting Chief Secretary to Government:—

"With reference to his letter of 9th May, 1916 the Secretary of the United Planters' Association of Southern India will be informed that instructions are being issued for the exemption from assessment of the profits of tea factories."

SOUTH INDIAN PLANTERS' WAR FUND.

	Rs.	A.	P.
Amount previously subscribed	44,677	4	8
Mr. N. Pollock	15	0	0
Mr. R. Lescher	25	0	0
Total Rs...	44,717	4	8

OVERSEAS AIR CRAFT FUND.

Balance	95	0	0

DISTRICT PLANTERS' ASSOCIATIONS.

Anamalai Planters' Association.

Minutes of a General Meeting of the Anamalai Planters' Association, held at the Club, on the 15th May, 1916.

PRESENT.—Messrs. B. M. Behr (acting Chairman), Pittock, Dobbie, Carless, Jones, Sladden, Scott, and Robb (Honorary Secretary). *Visitors*:—Rev. W. Lowsley and V. Hart. Mr. Hatton Robinson was represented *by proxy*.

(1) Minutes of last meeting were read and confirmed.

(2) GHAUT ROAD.—Read Mr. Barber's reply to Honorary Secretary's letter of 12th March, 1916.

(3) BRANCH ROADS.—The question of allowance of road metal per mile was explained by Mr. Hart, and it was decided to leave the matter in his hands.

(4) WESTERN OUTLET.—Members of the Association were asked again to point out to their companies or agents the necessity for an early entry into the agreement with the Cochin Darbar.

(5) TOWNSHIP.—Read letter from Collector of Coimbatore requesting the Association to suggest a suitable name for the new township. It was proposed by Mr. Pittock and seconded by Mr. Scott, "That the Post Office continues to be called 'Valparai' and that the township be called 'Valparai Town.'"—*Carried unanimously*.

(6) HOSPITAL.—Read and recorded letter from Chief Engineer D.P.W. Recorded with regret that little or no progress has been made with the Sub-Assistant Surgeon's quarters.

(7) MEDICAL.—Correspondence re. Mr. Simcock's complaint was read, and it was decided that no satisfaction would be gained by continuing the correspondence.

Read and recorded letter from District Magistrate in reference to extra, medical grant for "Free Coolies" from Kalichedu.

(8) POST OFFICE.—The following resolution proposed by Mr. Pittock and seconded by Mr. Dobbie was passed: "That this Association do approach Government to erect a temporary telegraph line to the existing Post Office, and open a telegraph office there until such time as the new Post Office is completed and the Postal Department are ready to transfer the Post Office and telegraph office to the new buildings."

(9) LEGAL MATTERS.—Read and recorded letter from District Magistrate in reference to Mr. Congreve's case.

(10) MINOR FOREST PRODUCE.—The accounts were submitted to, and passed by, the auditors. A vote of thanks to the retiring Honorary Secretary (Mr. Carless) was passed. It was proposed from the Chair and seconded by Mr. House:—"That Mr. Congreve be asked to take over the Secretaryship and Mr. Cotton do act until Mr. Congreve returns."

An amendment by Mr. Scott and seconded by Mr. Carless: "That Mr. Congreve be elected general Secretary and that he appoints collectors representing his, Valparai, Stanmore, and Kalianapandal estates and the eastern slopes, provided those concerned are agreeable to take up the posts. —*Unanimously Carried.*

(11) ASSOCIATION RULES.—A sub-committee consisting of the Chairman, Vice Chairman, Messrs. Cotton and Scott and the Honorary Secretary was elected, (three members to form a quorum) to revise the rules of the Association and circulate by post to the members their amended rules.

The meeting terminated with a vote of thanks to the Chair.

ARTHUR A. ROBB,
Honorary Secretary.

West Coast Planters' Association.

Proceedings of a General Meeting held at the Malabar Club, Calicut, on 3rd June, 1916.

PRESENT.—Eddivanna Rubber and Tea Company per Mr. R. Lescher, Mooply Valley Rubber Company per Mr. A. H. Mead and Mr. E. H. Halliley, Cochin Rubber Company per *proxy* Mr. H. Hadow, Pullangode Rubber Estate per Mr. H. Waddington (Acting Honorary Secretary).

CHAIRMAN.—In the absence of the Official Chairman Mr. Mead was elected to the Chair.

THE PROCEEDINGS OF THE LAST MEETING were confirmed.

288. ELECTION OF PLANTING MEMBER TO THE LEGISLATIVE COUNCIL, MADRAS.—The Acting Honorary Secretary read the Rules governing the method of election of a Member by the Planting Community. The Chairman called upon all the members to record their vote and place same in ballot box before the termination of the meeting.

In opening of the ballot box it was found Mr. J. A. Richardson was elected in the event of his being willing to accept office but if not the Hon'ble Mr. E. F. Barber was elected.

289 THE ACCOUNTS TO 31ST MAY were laid on the table, and approved.

290. S. I. PLANTERS' BENEVOLENT FUND.—The Acting Honorary Secretary reported that he had received for and remitted to this Fund Rs. 200 as compared with Rs. 570 in 1915.

291. LADY AMPTHILL'S NURSES' INSTITUTE.—It was decided to continue the support of this and the Honorary Secretary was instructed to pay the usual annual subscription.

292. S. I. Branch R G. A.—Read correspondence from the Secretary with reference to statistics. The Honorary Secretary was instructed to print for future reference summary of area planted under Rubber, by members of this Association, which was as follows :

In	Acres.
1902	238·50
1903	6·50
1904	209·00
1905	106·50
1906	1422·48
1907	1176·93
1908	2115·16
1909	522·48
1910	1977·42
1911	3028·32
1912	1846·23
1913	845·68
1914	880·09
1915	112·00
1916	98·91
Total ...	14,586·20

Mr. Mead informed the meeting that owing to great changes caused by the war in his staff he could not spare the time to attend the meeting of the S. I. Branch of the R. G. A. at Quilon. It was resolved to leave the matter to the Honorary Secretary and for him to appoint representatives from time to time as necessary.

293. *Rubber Growers' Association.*—The Acting Honorary Secretary reported that he had received only 4 replies to the Association's circular letter dated 15th March and that as far as he knew the R. G. A. was at present only supported by the following estates belonging to this Association :—

Mooply Valley Rubber Company.
Cochin Rubber Company
Eddivanna Rubber and Tea Company.
Calicut Estates Syndicate.

294. Scientific Department U. P. A. Experimental Stations. —Read letter from the Secretary U.P.A.S.I. advising that at a Committee Meeting of the Scientific Department held at Ooty on 29th February it was resolved that the site of the first Rubber Experimental Station be in the Palapilly District and asking Association to confirm this. The Acting Secretary reported that he had sent notice to all members and replies (being more than ¾ of total votes) all being unanimously in favour of site proposed he had written the Secretary U. P. A. confirming selection. Approved.

Read U. P. A. Circular No. 23/16 giving Government terms on which they are prepared to take over and open the Experimental Stations.

Mr. Mead explained that the question of the actual land to be given for purpose of Experimental Station was at present unsettled pending sanction of the Company's Directors to the proposals made by the Scientific Officer, U. P. A.

He informed members that he hoped to arrange, for the convenience of visitors to the Experimental Station, a motor car service from Pudukad Railway Station and residential quarters at his Estate Club within a few hundred yards of proposed Experimental Station.

295. TIMBER VALUATION TRAVANCORE.—Resolved that this Association support the Central Travancore Planters' Association's resolution of the 25th March :—"That this Association wishes to revert to the old Waste Land Rules, as the present proposals in Timber Values shut down all prospects of further planting development."

296. FACTORY ACTS.—Read letter from Acting Secretary to the Dewan of Cochin, dated 28th March, as follows :—"I have the honour by direction, to inform you that Rubber factories have been exempted from the operation of sections 6 (1) and 7 (1) of the Factories' Regulation in the Cochin State."

The Acting Honorary Secretary explained that this was all the Association had asked for. Recorded with satisfaction.

297. DOUBLE EXPORT DUTY ON TEA IN TRAVANCORE.—This is a matter outside the interests of this Association as it represents no tea in Travancore.

298. CHAMBER OF COMMERCE, MYSORE.—Read U. P. A. Circular 24/16 advising that Mr. L. E. Kirwan had been nominated to represent the U. P. A. Recorded.

299. U. P. A. S. I. ANNUAL MEETING will be held from 14th August at Bangalore.

Proposed by Mr. Mead seconded by Mr. Halliley :—

"That Messrs. Waddington and Lescher be the Association's Delegates and that the Honorary Secretary be instructed to pay them Rs.300 as expenses."—*Carried.*

300. HONORARY SECRETARY.—Mr. Halliley being unable to act Mr. Lescher was unanimously elected. Mr. Halliley proposed a cordial vote of thanks to Mr. Waddington for his services during the last 3½ years. —*Carried unanimously.*

301. COMMITTEE.—Messrs. Waddington and Halliley were elected to Committee to fill existing vacancies.

A vote of thanks to the Honorary Secretary of the Malabar Club for use of the room and to the Chairman, terminated the Proceedings.

(Signed) A. H. MEAD,
Chairman.

(„) R. LESCHER,
Honorary Secretary.

A CONFERENCE OF COFFEE PLANTERS.

A Conference of Coffee planters was held at the Office of the U. P. A. S. I. in Bangalore on 5th June to meet the Officers of the Scientific Department and discuss certain matters of vital importance to the Coffee industry.

The invitation of the Scientific Department to attend this Conference was responded to in a most gratifying way, twenty-six planters, representing six planting districts, being present,*viz*:—From Coorg, Messrs. P. G. Tipping, G. R. Pearse, W. A. F. Bracken, F. Macrae, N. M. Schofield, and Mr. Timmiah; from the Nilgiris, Messrs. A. S. Dandison, L. A. G. Rogers, and N. J. Staines: from the Shevaroys, Messrs. J. C. Large, and R. W. Gompertz,: from the Bababudins, Messrs. S. H. Dennis and W. H. Raikes: from North Mysore, Messrs. W. H. Pilkington, H. M. Northey, E. C. Bolton, T. R. Porter, W. H. Reed and C. H. Browne; from South Mysore, Messrs C. I. Hayward, C. Lake, E. W. Rutherford, St. J. Hunt, E. V. Hunt, and P. F. Anderson. Mr. H. T. Howell. Messrs. Staines & Co's. Chemist was also present, as also was the Secretary of the U. P. A. S. I.

The Chair was taken by Mr. Rudolph D. Anstead, M.A., the Deputy Director of Agriculture. Planting Districts, who was supported by Dr. L. C. Coleman, Ph. D., the Director of Agriculture, Mysore State, and Mr. W. McRae, the Government Mycologist, the Madras Agricultural Department, and Mr. C. H. Browne, the Chairman of the U. P. A. S. I., Mr. G. N. Frattini, the Scientific Assistant for Mysore was also present. The Hon'ble Mr. H. V. Cobb. C.I.E., C.S.I., I.C.S., the British Resident in Mysore and Chief Commissioner of Coorg honoured the Conference at the morning session with his presence.

In opening the proceedings, Mr. Anstead said:—"It gives me much pleasure to welcome you here to-day to this Conference, the object of which is to discuss a few matters vitally affecting the Coffee industry. I welcome also Dr. L. C. Coleman, the Director of Agriculture, Mysore State, and Mr. W. McRae, the Government Mycologist of the Madras Agricultural Department, who have very kindly consented to favour us with their presence, and to take part in our deliberations."

"The idea of holding a conference of this kind is somewhat of a new venture, at any rate during my period of office nothing quite like it has been attempted before. It is sometimes lost sight of how large an industry that of Coffee planting in South India is. The latest figures which I have been able to obtain show the following acreages of Coffee to exist:—

Mysore State	...	104,652 acres.
Madras Presidency	...	44,085 ,,
Coorg	...	42,495 ,,
Cochin State	...	2,507 ,,
Travancore State	...	986 ,,

A total of 194,735 acres, which quite puts in the shade the 64,000 acres of Tea and 50 000 acres of Rubber planted in South India."

"It seems fitting therefore that Coffee planters should from time to time meet together and discuss matters relating to this large and important industry. It is fitting that Tea and Rubber planters should hold similar conferences, I think, and I have hopes that this meeting will give them a lead and induce them to do so."

"In the last five years during which your Scientific Department may be said to have existed, it has had to struggle with many difficulties, lack of funds and lack of staff being not the least of these; still it has succeeded in doing a certain amount of work and getting together a few facts which may serve as a basis of discussion. Three points in especial have been put down for consideration at this meeting; how best to increase the yield of the Coffee by manuring; how to control those major diseases which each year take a heavy toll of the crop; and how it may be possible to re-vivify the strain of Coffee which has during recent years shown signs of deterioration after being continuously grown in this country for a period bordering on one hundred years. On these points I trust this meetlng may be productive of good results, and that we may be able to close up our ideas, so to speak."

"In conclusion a word as to the procedure which I propose to adopt. Each subject will be opened by a paper putting the problem before you as it stands to-day, showing briefly what has been done, and what it is thought might be done. This paper will be followed by an open discussion on the subject in general, following the main headings on the agenda paper before you. It is hoped that you will all take part freely in this discussion and give us the benefit of your experience on the estates so that we may arrive at some practical lines of future experiment and procedure."

"In order to get a practical benefit as a result of our deliberations I propose to draw up at their conclusion a series of conclusions and ask you to affirm them, much as you might pass resolutions. We can then publish these conclusions and say that they were arrived at after due deliberation by a conference of practical Coffee planters, and we can recommend them for adoption on Coffee estates generally."

"Very shortly, perhaps within the next twelve months, there is every prospect of your Scientific Department being put on a much firmer footing, being considerably enlarged in its scope, and being able to establish a Coffee Experiment Station. The conclusions which I hope will be arrived at and tabled to-day as a result of this meeting will prove a valuable aid when commencing work on this Station and deciding on what experiments shall be carried out upon it."

The first subject on the Agenda Paper was:—

The Spraying of Coffee as a prevention against the attacks of Fungoid Diseases.

(*a*) The results of Experiments carried out in 1915,

(*b*) The Effect of Spraying on Black Rot and Leaf Disease and on the general health of the Coffee.

(*c*) The cost of the operation.

(*d*) The best time to spray.

(*e*) The possibility of spraying large areas, and results likely to be obtained.

(*f*) The most suitable sprays and apparatus to use.

In asking Dr. Coleman to read a paper on this subject Mr. Anstead said.

" Dr. Coleman has most kindly consented to take charge of this subject and to introduce it. Dr. Coleman needs no introduction from me to Coffee planters. Most of you know him personally and by his ever ready courtesy and kindly aid in all matters relating to Coffee in and out of Mysore he has taught us to look on him as one of ourselves. I will therefore ask Dr. Coleman to address us."

Dr. Coleman then delivered a brief and able digest of the work which had been done to date and of the present position of the problem. At the end of this paper a long and well sustained discussion took place in which the majority of those present took part. At the close of the discussion the following conclusions were arrived at as representing the general opinion of the conference :—

That the results obtained by spraying Coffee with Bordeaux Mixture as a prevention against the attacks of fungoid diseases, especially Black Rot and Leaf Disease, may so far be considered satisfactory, and they point to the probability of their proving efficacious in keeping these pests under control, and warrant further experiments over one or more large areas.

That the cost of such spraying, estimated at approximately Rs. 15 per acre, is by no means prohibitory in view of the heavy monetary loss annually incurred from these pests.

At the end of the morning session the Chairman thanked the Hon'ble the British Resident in Mysore for his kindness in attending the Conference. In reply to Mr. Cobb said :—It had been an altogether unexpected pleasure to him to be able to be present. He had come to learn and not to teach and he had been extremely interested in the discussion. He had every right to be so considering that he had learnt for the first time, as Chief Commissioner of Coorg and Resident of Mysore, that coffee in Coorg covered an acreage of 42,000. Five years of his life in India had been spent in association with the Planting Community of the Nilgiris and the Wynaad, so that he now felt he was back amongst old friends. Bearing in mind the friendship and hospitality of those days, he hoped that both in Mysore and Coorg, it would always be possible for him to do all he could to advance the interests of the great industries in which they are engaged.

At the afternoon session the following subjects were discussed :—

B.—The Manuring of Coffee.

(*a*) The results obtained on various Experiment Plots during the last 3—4 years.

(*b*) The relation of Manuring to Diseases and Spraying.

C.—The Improvement of the Strain of Coffee in Southern India.

(*a*) The need for new strains of seed.

(*b*) Seed selection and Plant Breeding to obtain an improved strain.

(*c*) The possible use of existing Hybrids.

(*d*) The introduction of seed from other countries and the benefits likely to result.

(*e*) The introduction of new species of Coffee.

(*f*) The suitability or otherwise of Robusta Coffee to South Indian conditions and its susceptibility to disease.

The results obtained on the various manurial experiment plots during the last three years were presented and a general discussion on the subject of manures and manuring as related to Coffee took place.

Mr. Anstead introduced the third subject, which again led to a lively and interesting discussion at the close of which the following conclusions were subscribed to by the Conference.

That better results can be obtained by selection and breeding methods with existing types of Coffee than by importing seed of arabica or other varieties from other countries.

That the results so far obtained with Hybrids in South India justify further work on and trial with this class of Coffee.

That selection methods on a systematic scale are absolutely necessary.

The Conference came to a close at 4-30 p.m. with a vote of thanks proposed by Mr. C. H. Browne, the Chairman of the U. P. A. S. I. to the chairman and the members of the Agricultural Departments present. In a brief reply Mr. Anstead thanked Mr. Browne and the gentlemen present for attending the Conference and making it such an unqualified success and he also thanked Dr Coleman and Mr. McRae for their kindness in attending the meeting and taking part in discussions. Dr. Coleman contributed very largely to the success of the Conference both by his interesting paper and by the whole hearted way in which he took part in the discussions throughout.

In the next issue of the *Planters' Chronicle* the text of Dr. Coleman's paper will be reproduced, as also the more salient points of the discussions on the subjects considered at the Conference.

Soil Erosion Due to Heavy Rainfall.

This subject is one of interest to planters in the West Indies, especially in those islands the mountainous configuration of which causes a large annual rainfall. In a note in *The Colonial Journal*, January 1916, some useful suggestions with reference to this matter, as affecting Ceylon planters, are given. With regard to low lying land two inexpensive measures of dealing with the mischief are suggested—enbankments and surface drainage. Surface drainage is carried out by means of trenches where there are small differences of level. Drainage increases the aeration of the soil, and to a great extent, increases the value of the crops. Efficient drainage enables rather low lying lands to produce valuable crops. As regards land on hillsides, the method suggested is to terrace immediately all lands from which the original forest has been removed. A regulation enforcing this exists in Java. A striking example of soil erosion is afforded by some lands in Ceylon in the central hills. Over a large area the forest was originally removed to make room for coffee, which later gave place to tea. No provision was made to retain the soil of the original forest, and, in consequence, the erosion of the soil has been enormous, and is still going on. Hence large sums are spent annually in adding manures to the land, because the soil-capital of the island has run to waste, and can never be replaced by any system of manuring.—*The Agricultural News.*

MARKETS, PRICES, AND STATISTICS.

Coffee.

Monthly Statistics to 30th April.

East Indias.		1916. Tons.	1915. Tons.
Landed to 30th April	...	1,274	1,337
Delivered to 30th April	...	1,098	1,446
Stock on 30th April	...	1,504	1,330
Coffee of all kinds.			
Stock in United Kingdom 30th April.		29,750	17,250
Total European imports	...	143,700	202,475
Total European deliveries	...	147,590	206,890
Total European stock	...	202,470	251,415
World's visible supply	...	493,000	527,880

A decrease of 26,706 tons compared with a decrease of 37,650 tons last year.

After an interval of nearly three weeks, during which a fair amount of business had been done privately at steady prices, auctions were resumed on the 2nd May, when there was a good demand for everything except the bold sizes; these, being the highest priced, suffer from the fact that the increased duty has made buyers give more attention to the cheaper grades, and the keen competition for the latter, combined with the poor quality of the crop, is having the effect of closing up the range of values. In many cases 10 - or 12 - would cover the difference between A and T; a year ago it was nearer 20/-.

Offerings in auction have been:—

——	2—5 May.	Total since 1st Jan.	Last year.
East India ...	6,898	13,798	14,018
Costa Rica ...	6,807	58,527	54,114
Other Milds ...	1,767	48,615	75,624
Brazil ...	4,552	28,345	53,010
Robusta ...	274	583	10,375
B. E. A. and Uganda ...	635	7,310	6,868

The following prices have been obtained for South Indian Coffee:—

	No. 1.		No. 2.		No. 3.		PB.		T.	
MYSORE.										
Kent's XH ...	13	80/-	27	76/-	11	72/6	4	83/-	6	68/-
Subbanhulli ...	40	80/-	13	74/-	3	65/-	10	79/-	...	...
Gubgull ...	33	N.	14	70/-	3	63/-	8	N.	4	62/-
Cannon, B. ...	46	N.	68	79/6	37	75/-	14	93/-	15	69/6
Cannon, M. ...	27	84/6	28	77/6	7	72/6	5	85/-	7	71/-
	45	84/-	38	82/6	9	73/-	8	85/-	9	69/-
Santawerry ...	20	84/6	26	77/6	4	69/-	7	89/-	8	70/-

	No. 1.		No. 2.		No. 3.		PB.		T.	
MYSORE.										
Santawerry, J. ...	29	82/-	21	74/-	2	67/6	7	82/-	6	69/-
Mockett, S. & L. ...	22	N.	12	68/6	3	64„6	5	N.	4	65/-
Mockett, G. ...	38	N.	20	75/6	5	67/6	6	N.	6	68/-
Yellikodigi ...	38	N.	26	74/-	5	68/„	5	N.	6	68/-
	37	N.	15	73/-	5	68/-	6	N.	8	68/-
Woger ...	13	N.	7	N.	2	67/-	4	N.	...	...
Kent's Chick ...	49	78/-	14	N.	3	67/-	8	80/-	6	69/-
Bibbenluke ...	29	N.	21	N.	4	66/-	11	N.	16	67/-
Guntanaik ...	21	72/6	16	N.	3	60/-	8	N.	9	65/-
Chetanhulli ...	34	N.	48	N.	19	70/-	10	N.	10	67 6
Mudsouci ...	33	N.	33	N.	9	66/-	10	N.	9	67/-
Murgaddi ...	39	77/-	25	74/-	7	65/-	14	78/-	6	64 6
Goody Tota ...	23	75/-	21	71/6	7	66/-	13	N.	8	66/-
Buchanan's ...	39	80/6	15	74/-	5	68/-	9	92/6	...	...
Macdougall's ...	27	N.	30	73/-	12	67/6	13	80/-	...	...
Honametti ...	14	N.	9	N.	...	...	1	N.	2	64/-
Buchanan's ..	15	79/-	6	73/6	2	68/-	4	79/-	3	67/-
	19	N.	8	71/6	3	65/6	5	N.	3	65/-
Utallalu ...	137	N.	73	75/6	11	70/-	49	N.	45	68 6
Hooli Hundloo ...	40	N.	34	N.	9	67/-	8	N.	9	66 6
Buskull ...	67	N.	29	70/6	5	66/-	13	N.	16	65 6
Ootsey ...	7	74/-	9	69/-	3	65/-	2	N.	3	65/-
Ooghully ...	9	75/-	10	73/6	5	67/-	4	N.	15	66/-
Handi ...	30	76/-	18	72/6	7	67/6	5	N.	...	...
Kulhutty ...	68	92/-	9	80/-	1	69/	9	102/6	4	71/6
Chundrapore ...	15	72/6	10	68/-	5	65/-	4	N.	...	...
Alagaishwara ...	11	N.	13	67/-	5	64/-	4	N.	6	63/-
Bellagode ...	12	79/-	14	74/-	3	65/-	3	N.	5	66/-
Hospet ...	33	78/6	26	76/6	3	67/-	12	84/6	12	67/6
Cannon, B. ...	28	N.	44	78/6	24	72/6	9	N.	8	69/-
Santawerry ...	131	N.	38	76/6	4	67/-	14	88/-	14	68/-
Santawerry. J. ...	41	80/-	16	77/-	1	65/-	6	85/-	7	68 6
Jeccan ...	20	N.	51	75/-	34	71/6	7	N.	14	66 6
C. D. ...	18	N.	16	67/6	6	64/-	5	N.	7	64 6
Yelliemudloo ...	17	N.	13	71/6	...	...	9	80/-	10*	67/6
COORG.										
Aynsley ...	43	N.	22	N.	1	64/-	8	79/-	10	68/-
Santikoppa ...	49	N.	21	73/-	...	...	9	78/6	19	67 6
Covercooly ...	39	N.	16	74/-	...	...	6	82/-	21	67/-
Hallery ...	45	N.	32	73/6	...	...	2	78/-	24	67/-
Covercooly ...	59	N.	37	74/-	6	66/6	23	N.	14	67/6
Hallery ...	44	N.	40	75/-	12	68/-	11	N.	10	67/-
Covercooly ...	35	N.	18	N.	3	63/-	8	N.	7	64/-
Eldorado ...	173	N.	166	70 6	3	64/6	69	N.	...	...
Dubarry ...	77	N.	55	N.	1	65/-	26	N.	18	66/-
Santikoppa ...	152	77/-	59	73/-	1	65/-	35	N.	43	67/6
Santikoppa, IM. ...	133	75/6	83	71/-	...	...	30	N.	...	...
Ali Cado ...	11	75/-	10	72/-	1	64/-	2	N.	4	66/-
WWF. B. ...	26	N.	23	72/6	1	67/-	6	N.	11	67/6

Tea.

The following figures are published by the Indian Tea Association for the month of April 1916. : —

	1916.	1915.
	lbs.	lbs.
Sailings to Great Britain—		
From Calcutta	5,057,702	618,297
From Chittagong	6,004,120	—
Sailings to Australia and New Zealand ...	216,411	40,901
Sailings to North America	80,078	20,277
Sailings to Other Places	4,191,131	302,824
Sailings from South Indian Ports ...	1,974,292	1,972,432
Total sailings in April ...	17,524,734	2,945,731

The following shipments were made from South Indian ports during the month of April 1916 :—

	lbs.
From Cochin—	
To London	158,753
To Asiatic ports	35,805
From Tuticorin—	
To London	531,497
To Colombo	49.336
To Bombay	9,040
From Alleppey—	
To Asiatic Ports	9,322
From Calicut—	
To London	1,124,177
To Mombasa	1,305
To Aden	1,000
To Bombay	50,532
To Colombo	3,525
Total ...	1,974,292

The Export of Tea from Ceylon from 1st January 1916 to 22nd May 1916 was :—

	lbs,
Black Tea	60,926,512
Green Tea	1,172,698

the corresponding figures for 1915 being 66,179,788 lbs. and 2,147,404 lbs. respectively.

In view of the proposed mission of Mr. D. T. Chadwick, the Director of Agriculture, Madras Presidency, to Russia to study the trade relations between that country and Southern India it is of interest to note that during April 1916, 3,778,963 lbs. of Tea were shipped to Russian ports from India.

Auctions re-opened with a very strong demand at an all round advance of ½*d.* to 1*d.* but on 7th May, although there was a fair enquiry, the previous high range was not quite maintained. On 11th May there was less competition. Teas under 1/- were ¼*d.* down from the top. Better kinds were almost steady.

R. D. A.

CORRESPONDENCE.

Labour Department.

Superintendent's Office,
Mangalore, S. Canara,
5th June, 1916.

THE EDITOR,
The Planters' Chronicle,
Bangalore.

Sir,—Mr. Raikes' letter in your issue of 27th May should properly be answered by the Superintendent of this division, but as his touring and case work keeps him out of office for the greater part of the month, I answer, so far as I can, the point raised.

The Labour Department of the U. P. A. S. I. in no way lays down terms or insists on Maistries carrying out certain rules. It is clearly laid down in Circular 2, page 4, that the Director does not wish his Superintendents to usurp the place of the planter as master of the writers, maistries or coolies as the case may be, only to assist in carrying out the agreements arrived at by these parties.

If I am thinking of the right case, the Superintendent had only to give out certain money for Mr. Raikes provided the writer was willing to produce his agreements for a certain sum and security for another sum. This was supposed to have been settled on the Estate, but the man flatly refused to carry out the first part. I as flatly refused to hand over the money (the Superintendent was absent) and there the matter ended. The Department can refuse to hand over money unless conditions are complied with, but it cannot force men to comply with them by any other means if persuasion fails.

Yours faithfully,
JOHN G. HAMILTON.

THE EDITOR,
Planters' Chronicle,
Bangalore.

Dear Sir,—I am very glad to see that your paper is attracting attention on Labour matters, and I congratulate "Sambellum" on his thoughtful letter which appears in your issue of the 3rd instant.

The Kangany's remuneration very largely depends on the amount earned by his coolies, and if he finds himself with nothing at the end of the year's work, he takes it out of his next advance by various means such as getting his coolies to agree to larger advances than they actually received

and so forth. Naturally such tricks lead to the breaking up of his gang and loss to the Estate, so that "Sambellum" is quite right in showing that the Kangany's interest should be looked after. If the Kangany sees a way of earning money honestly (it is a comparative term with him) he will be the less tempted to swindle. The man with a big personal debt which he knows he cannot possibly pay does not care if it snows! The question of debiting the Kangany with bolter's debts is a thorny one. Even as things are, cases occur when a cooly or coolies leave the Estate with the connivance of the Kangany. In these cases the Kangany knows he has means to recover the debt, if there is *really* any, in the villages, which he will do whether the debts are debited to him or not. In other cases, he can and often does appeal to the Labour Department for assistance, but it is remarkable in how few cases are these claims justified "in toto," and when the "panchayat ad hoc" finds a false or partially false claim has been made, there is naturally no sympathy with the Kangany. On the whole therefore I think the Kangany is liable for bolter's debts. Hard cases may occur, in which cases the Labour Department is at the Kangany's disposal, and will give him all the assistance in its power. The other specific points raised by "Sambellum" affect proprietors of Estates more vitally than the Labour Department, so I shall not take up your space in dealing with them, but I hope others will not fail to take up the lead given by "Sambellum's" letter. In the general question of the examples given us by Ceylon, it is not sufficient merely to avoid falling into the mistakes which have led to so much trouble in that Island, we must follow their example in everything that is good. The way Ceylon Estates and Districts are tackling the question of infant mortality, general sanitation, medical attendance, and schooling for coolies' children, is most praiseworthy. We are behind them in these respects in S. India and too slow in imitating their good example, although in some other respects we may be ahead of them.

The points I have mentioned are also looked after in Northern India (Assam etc.,) and countries beyond the Sea (Malaya and our Colonies) to an extent that would surprise my friends in S. India. With some honourable exceptions we are distinctly in the dangerous and disadvantageous position of being behind the times, and I see little general inclination to keep up with them in these very important items of the management of labour.

Yours faithfully,

AYLMER FF. MARTIN,

Director of the Labour Department.

Coimbatore, 7—6—1916.

P.S.—Since writing the above, I see a reference in the *Madras Mail* of the 6th instant, to the splendid dividend earned by Seafield Estate in Malaya. The place proved very malarious, and the Manager (well known on the High Range of Travancore) spent £12,000 sterling in turning the water through pipes under ground in the ravines, thus making a labour force possible and allowing this dividend to be earned.

A. Ff. M.

The Planters' Chronicle.

RECOGNISED AS THE OFFICIAL ORGAN OF THE U. P. A. S. I., INCORPORATED.

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THE U. P. A. S. I.

(INCORPORATED.)

Contents.

We publish a paper read by Doctor Coleman, Director of Agriculture Mysore at the Conference of the Coffee Planters on June 5th. Dealing as it does almost exclusively with spraying, it is to be hoped that it will lead to a good deal of discussion in our column.

A short foot note taken from "Nature" shows the great strides made by the Decimal System. When the war terminates will be the most favourable opportunity to introduce a universal compulsory commercial system.

Markets, Prices, and Statistics are furnished by R. D. A.

We have been asked to republish an article on *Indian Immigration* taken from the *Malay Weekly Mail*.

Two letters on Spraying for Leaf disease appear in our columns—the first fruits of the Coffee Planters' Conference, which we hope will be followed up.

The Director of the Labour Department asks us to publish the following information:—

Subscribers will please note that Mr. C. C. Kent is now in charge of the Mysore State Circle including Kollegal taluk of Coimbatore District.

His address till further notice is Empire Hotel, Mysore.

Registered abbreviated telegraphic address "Upasi" Mysore.

SOUTH INDIAN PLANTERS' WAR FUND.

	Rs.	A.	P.
Amount previously subscribed	44,717	4	8
Mr. A. Yates	40	0	0
Mr. D. V. Crowe	7	8	0
Billiard Room of the Ootacamund Club ...	100	0	0
Pullangode Pistol Club	5	0	0
Mr. A. H. Robb	45	0	0
Total Rs...	44,914	12	8

OVERSEAS AIR CRAFT FUND.

Balance	95	0	0

A CONFERENCE OF COFFEE PLANTERS.

At the Conference of Coffee Planters held in Bangalore on 5th June, the preliminary account of which appeared in our issue of last week, Dr. Coleman, Ph.D., the Director of Agriculture, Mysore, read the following paper dealing with the first subject on the Agenda, the Spraying of Coffee as a prevention against the attacks of Fungoid Diseases.

"The two most serious diseases of coffee in South India are, I think, most planters will be prepared to admit, Leaf Disease and Black Rot. Both of these are primarily leaf diseases resulting finally in the dropping of the leaves before they have completely performed their function. That function is, as you all know, that of manufacturing material for the formation of new tissue for the plant whether it be wood, leaf, fruit, or root. In addition Black Rot, where it is really serious, causes direct and important loss of fruit as well."

"The only method we possess, at present, to combat such diseases as these two is by means of applying a fungicidal mixture which will prevent the fungus spores which may drop upon the leaf from germinating. In the case of Black Rot, where the whole of the disease producing organism grows outside of the plant and can thus be reached, such a mixture would in addition have a direct killing effect upon the fungus itself."

"Up to a few years ago the spraying of coffee as a practical measure was considered by most planters as among the impossibilities. The advent of the Green Bug into Mysore and Coorg has helped to a considerable extent to change this view, although there are still many who hold to it. I think in any case that even the most sceptical will be prepared to admit that the possibilities are such as to warrant a great deal of attention being paid in the future to this question, and that wherever either or both of these two serious diseases of coffee occur to a serious degree extensive tests should be made as to its feasibility."

"It is not my purpose to enter in detail into the questions involved, more especially as the results of Experiments conducted by Mr. Frattini, the Assistant Scientific Officer in Mysore, have but recently been published and must be in your hands. I quite realise that from your standpoint only three questions directly interest you and they are these ;—

1. Is Spraying practicable under estate conditions ?
2. Is the operation now, or can it be made, sufficiently cheap to be taken up by planters ?
3. Is it really effective in checking these two diseases ?

"With regard to the first of these questions it is I submit one which each planter will have to answer for himself and I take it that he will not be able to answer until the other two questions have been solved. Even should a practical solution of them be assured there will remain the additional consideration of the difficulty of providing labour for the operation, but I take it that this can be solved by planters themselves as soon as it is definitely shown that spraying pays."

"The answer to the second question depends mainly upon two points (*a*) How efficient a sprayer can be obtained for spraying on coffee and (*b*) How cheaply an effective spraying mixture can be prepared."

"With regard to the first point the sprayers which are at present being used on Coffee Estates are generally admitted to be efficient, but were spraying to be taken up on a large scale it is probable something more efficient and more rapid in action would be required. Small power sprayers have been suggested and at first thought appear attractive, but the almost insurmountable objection in coffee estates appears to be the presence of shade trees which would make the use of long lines of hose of doubtful feasibility. It seems probable that a more efficient arrangement would be the battery sprayers which are now on the market and circulars with regard to which I have no doubt you have all received. With them one man does the charging of a large number of sprayers by means of a separate pump which pumps into copper or brass sprayers first the spray mixture and then the air. These battery sprayers were introduced by the Grrman firm of Holder Bros. about four or five years ago and were in use on cocoa and other estates in the Kameruns apparently with satisfactory results. Their manufacture is now being taken up by the English Firm of Four Oaks. The price at present for an outfit is almost prohibitive but should come down soon after the war is over."

"It is possible that still more efficient apparatus may be devised but I think we may conclude that the pressure sprayer is likely to be, for a good many years, the most suitable one for coffee estates."

"With regard to spray material it is also unlikely that anything more efficient than Bordeaux will be found in the near future. A reduction in cost could therefore be effected only if we used a weaker mixture or one not containing the adhesive with which it is commonly used in Mysore. As a matter of fact the mixture as it has been used here for the arecanut Koleroga is really double strength and I see no reason, certainly as far as leaf disease is concerned, why the weaker mixture would not be equally effective. If this reduction were made and the adhesive were left out it would reduce the cost of the spray materials to about 2/5 of what it is at present. Only extensive tests will enable us to decide as to whether this reduction in cost is a safe one, *i.e.* one which does not at the same time reduce the efficiency of the spray."

"The present cost of spraying an acre of mature coffee has been variously estimated and figures so widely divergent as Rs.15 and Rs.25 per acre have been given. These estimates have, I believe, in all cases been for the stronger mixture. As the cost of materials is usually responsible for rather over 80 % of the total cost of spraying a reduction in the cost of the mixture will have a much greater effect on the total cost of spraying than will a proportionate reduction in the labour bill through the introduction of improved spraying methods. We see then that from the cost point of view it is much more important for us to ascertain what is the cheapest spray mixture which is really effective than it is to introduce a more efficient spraying machine. This, of course, does not take into consideration the fact that, where labour is very difficult to obtain, the whole feasibility of spraying may hang upon the possibility of making one man do what two men have done heretofore."

"As already stated the final criterion by which we must judge the usefulness of spraying either for Black Rot or Leaf Disease will be, does the increased yield as a result of spraying give a fair profit on the money spent on it? This can be answered only by practical tests on estates and such tests will have to be continued over a series of years. The results up to the present do not tell us anything with

regard to this question as last year both on estates where spraying was done for Black Rot by Mr. Frattini, as well as those sprayed by Mr. M. K. Venkata Rao of the Mysore Agricultural Department the disease was so slight in its attack as to produce little loss. On the other hand where spraying was done for leaf disease the effects will first be seen in the next crop. Those, however, who have seen the effect of Mr. Frattini's spraying work at Hooldy will anticipate a very decided increase in yield as a result of spraying."

"There is one point upon which I have not touched as yet. It is, as it were, the one fly in the ointment. You will remember that the chief natural control of the Green Bug is furnished by two parasitic fungi. Now these fungi are probably just as susceptible to the action of a fungicide as are the Black Rot and Leaf Disease fungi, so any spraying which is done to check the development of the fungi causing the two coffee diseases is practically certain to prevent the development of these two fungi as well. With regard to spraying for leaf disease this will not be such a serious matter, as in all probability it will be found that spraying for this disease can be postponed till September by which time the Green Bug Fungi should have done the greater part of their useful work."

"A number of coffee planters have, in conversation with me, urged the great difficulty in arranging for spraying over very large areas and I must confess that the job of spraying an estate covering three or four hundred acres would not be a light one. In the case of Black Rot I doubt if it would be possible to find a large estate with the whole of it seriously affected by the disease and in this case it would of course be wisdom to spray only portions likely to be seriously attacked."

"In conclusion I think we may safely say that while the results of spraying for the control of coffee diseases do not yet warrant its being recommended as a regular estate operation they are distinctly promising and justify the continuance of the work on a much more extensive scale. Most planters are provided with sprayers. The ingredients of Bordeaux Mixture are not particularly difficult to obtain although the present price of the chief ingredient, copper sulphate, is about double what it was a year ago. It is to be hoped that a large number of planters will take up the work on a small scale so that results can be obtained under as many different conditions as possible. A cordial co-operation between the scientific staff of the U.P.A.S.I. and the Mysore Department of Agriculture on the one hand, and coffee planters on the other, should lead us, in the course of the next two or three years, to pretty definite conclusions as to the feasibility and profitability of spraying to prevent diseases of coffee."

In the discussion which followed Dr. Coleman's paper the following were the most important points brought out:—

(*a*) Speaking generally the experiments carried out in Mysore, British East Africa, and elsewhere indicate that periodic spraying of Coffee with Bordeaux Mixture goes far to check the ravages of all fungoid diseases, not only Black Rot and Leaf Disease, but also more obscure diseases like the "die back" of the branches. It is necessary to spray the plants thoroughly, however, covering the under surface of the leaves with the spray material, and the spraying of the fallen leaves and mulch only is not sufficient in all cases.

(*b*) One spraying in the year only can be advocated at present. Young leaves which develop after the Coffee has been sprayed are not protected. The spraying is effective just so long as the spray material remains on the leaves and young growth is liable to infection.

(*c*) On small areas spraying with Bordeaux Mixture has proved so effective in the case of the Areca Palm Koleroga that after it has been carried out for two years the damage done by the fungus is so slight that it is not worth while spraying for. A similar result was obtained by Mr. P. J. Anderson in the case of a *Botryodiplodia* on another crop on a small isolated estate.

Whether large areas of Coffee can be effectively sprayed remains to be proved. If they can it is possible that similar results would be obtained and that after treatment for one or two years the fungoid diseases which now do so much damage would be reduced to such small proportions that further regular spraying would be unnecessary. This needs proof and experiments along these lines are eminently desirable. The difficulties of treating large areas are labour on the one hand, and suitable sprayers and expense on the other. In many cases these difficulties can be overcome and it is possible that an experiment over a large area could be carried out by the aid of the Mysore Agricultural Department. An estate of 200 acres well isolated at Balehonnur was offered for the purpose of such an experiment by Mr. C. H. Browne.

(*d*) The cost of spraying was put at approximately Rs.15 per acre. The cost, however, depends on a number of factors, accessibility of water, availability of labour, sprayers, materials, closeness of planting, size of the trees, etc. and it cannot be definitely laid down.

The cost of Copper sulphate is fluctuating with an upward tendency on account of the War. It can at present be obtained in Bombay and the last consignment cost Rs. 55 per cwt. Sprayers are also difficult to get. Messrs. Four Oaks & Co., might be able to get permission to obtain copper to make a large consignment if a co-operative order were given them, but they could scarcely be obtained before the end of the year. Enquiries are being made as to the possibility of local manufacture.

For the spraying of large areas a battery sprayer which fills the individual sprayers with liquid and pumps up the necessary pressure at a central station will probably be advisable. Such an equipment costs about £14 and could be obtained from England about September—October next.

The cost of materials might be reduced by using the mixture at half strength, which appears to be equally effective, and omitting the adhesive mixture usually added, and experiments on these limes are being carried out.

(*e*) The Bordeaux nozzle is not the best to use especially in the hands of a cooly. The ordinary Vermorel cyclone nozzle used for insecticides and the spraying for Green Bug is equally effective for applying Bordeaux Mixture.

(*f*) When Black Rot, Leaf Disease, and Green Bug are all present it is a question as to which is the most important. Bordeaux Mixture will almost certainly kill the parasitic fungi which control the Green Bug to so large an extent, so that if the Coffee is sprayed for Black Rot before the monsoon these fungi cannot be depended upon to kill the Green Bug during the monsoon and insecticides will have to be applied at a time when it is most difficult to spray effectively. In the case of Leaf Disease it is not so complicated because spraying for this would be done in September at a time when the Green Bug fungi are not active. If Coffee is badly attacked by Green Bug it is not advisable to spray it with Bordeaux Mixture before the monsoon.

At the close of the discussion a small committee was appointed to draft the text of the general conclusions arrived at. They presented the following which was unanimously agreed to by the Conference :—

That the results obtained by spraying Coffee with Bordeaux Mixture as a prevention against the attacks of fungoid diseases, especially Black Rot and Leaf Disease, may so far be considered satisfactory, and they point to the probability of their proving efficacious in keeping these pests under control, and warrant further experiments over one or more large areas.

That the cost of such spraying, estimated at approximately Rs. 15 per acre, is by no means prohibitory in view of the heavy monetary loss annually incurred from these pests.

In the recently issued annual report of the Decimal Association for 1915, it is stated that the past year has shown a distinct advance in public opinion in favour of the compulsory introduction of the metric system of weights and measures. It is pointed out that our manufacturers are severely handicapped as regards trade with foreign countries by the retention to our present weights and measures. As the metric system is in use in the majority of foreign markets the British manufacturer who wishes to introduce his goods into those markets is at present obliged to maintain two systems of weights and measures, both in his works and in his office. On the other hand, his competitor on the Continent employs only one system throughout, and that system is understood both by the middleman and the customer. One of the results of the war has been to familiarise the nation with the metric system to a remarkable extent. The presence of our soldiers on the Continent and of Belgian and French refugees in our midst has been an important factor in bringing this about. The nation has already had to experience so many drastic innovations that a reform of our weights and measures would not now meet with that blind opposition from the general trading community which up to the present has been apprehended by the authorities. The inconvenience experienced by the public owing to the exclusion of German and Austrian wares, especially certain classes of goods which have become almost necessaries, must have caused the nation to realise that improvement in our business methods is urgently required. The Association hopes that the Government will take advantage of the favourable opportunity which war conditions have created for introducing legislation to bring our weights and measures into conformity with those which have been proved by our competitors to be the most suitable for stimulating external trade.—*Nature*.

MARKETS, PRICES, AND STATISTICS.

Coffee.

The following amounts have been offered at auction:—

——	9—12 May.	Total since 1st Jan.	Last year.
East India ...	2,594	16,347	17,182
Costa Rica ...	5,630	64,157	61,026
Other Milds ...	1,555	50,170	79,403
Brazil ...	4,935	33,280	58,386
Robusta ...	—	583	10,525
B. E. A. and Uganda ...	12	7,322	7,351

The following prices were obtained for South Indian Coffee:—

	No. 1.		No. 2.		No. 3.		PB.		T.	
MYSORE.										
Mavinkere ...	39	77/6	24	N.	4	N.	8	N.	7	67/-
Kalhutty ...	83	N.	43	N.	6	71/-	18	N.	8	70/6
P. S. ...	8	N.	10	75/6	8	70/6	2	N.	3	66/-
	8	N.	7	75/6	6	70/6	2	N.	...	...
HC. S. ...	97	N.	30	76/6	4	66/6	15	89/6	22	69/-
HC. SS. ...	24	N.	14	N.	2	65/-	4	N.	6	66/-
X. Q. ...	124	N.	37	N.	6	67/-	15	N.	13	67/6
HC. K. ...	81	N.	28	77/6	5	67/-	15	N.	9	N.
Honeyvale ...	116	N.	60	N.	49	71/6	19	87/6	15	68/-
Attikhan ...	24	N.	18	N.	1	65/-	3	81/-	4	66/-
Honnametti ...	5	N.	5	72/-	...	...	1	N.	2	64/6
Gorrayhatti ..	32	N.	13	N.	...	...	3	85/-	4	67/-
Granite Hill ...	29	75/6	20	71/6	9	69/6	9	77/-	7	66/6
Macdougalls ...	10	79/-	23	74/6	12	69/6	9	78/-	7	67/-
COORG.										
Kaima Betta ...	33	N.	54	N.	6	67/-	9	N.	10	67/-
Santikoopa ...	66	77/-	32	73/6	1	65/-	20	79/-	19	68/6
Hallery ...	20	78/-	14	73/-	1	65/-	4	N.	6	66/-
	17	N.	16	N.	5	66/-	5	N.	5	67/-
Santagherry ..	112	N.	61	73/6	1	66/-	25	80/-	20	68/-
Covercooly ...	31	79/-	18	74/-	...	...	7	80/-	18	68/6
	146	79/-	74	74/6	...	...	40	80/-	59	68/6
Kibberi Betta ...	73	N.	71	N.	6	67/6	21	N.	18	68/6

Tea.

The following prices were obtained for South Indian Tea at the auctions of 8th, 15th, and 22nd May.

—	B.O.P.	O.P.	Pek.	B.P.	P.S.	P.F.	B.T.	Fgs
Nilgiris.								
New Hope ...	1/-	1/-¼	11¾	...	11½	...	...	...
Prospect ...	1/2¼	...	1/1¾	1/1¾	...	...	...	...
Seaforth ...	1/1	1/1½	1/-½	1/-¾	...	...	...	...
Daverashola ...	1/4¼	1/2½	...	...	...	...	...	...
	1/3½	1/2¾	...	...	...	...	...	...
Woodlands ...	1/-½	...	11½	1/-¼	11¼	...	...	...
Barwood ...	1/1	...	1/-¼	...	...	...	...	...
Cherakara ...	1/-¾	1/1½	...	11¾	11¾	...	...	...
Woodbriar ...	1/1	...	1/-	1/-½	11¾	...	...	...
Travancore.								
Gramby ...	...	...	11¾	1/-¼	...	11¾	...	...
Mount ...	...	...	1/-	1/-½	...	...	...	...
Pambanar ...	...	...	1/-	1/-¾	...	...	...	...
	...	...	1/-	1/1¼	...	...	...	...
	...	...	1/-	1/-½	11½	1/-	...	...
Bonaccord ...	1/-¾	...	1/-	11¾	...	...	...	...
Carady Goody ...	...	11¾	11½	...	11	...	...	11½
	...	1/-½	1/-	1/-¾	...	...	...	1 -
	...	1/-¾	1/-	1/-½	...	...	...	...
Nellikai ...	1/-½	...	11½	11¾	11¼	11¾	...	...
Thengakal ...	1/-½	...	11¾	1/-¾	...	...	...	...
Bon Ami ...	1/1	...	1/-¼	...	...	...	...	...
	1/-½	...	1/-¼	1/-1¼	...	1/-	...	...
	1/1	...	1/-½	1/-½	...	...	...	...
Fairfield ...	1/-½	...	11½	...	...	...	...	...
	...	...	11¾	1/-¼	11¼	...	...	...
Pasumally ...	1/-¼	...	11¾	11¾	11¼	...	...	...
Munja Mullay ...	1/-¾	...	11¾	1/-¼	...	...	...	...
Merchiston ...	1/-	1/1½	1/-½	1/-¾	...	...	...	...
Kolliekarnum ...	...	...	1/-¼	1/-½	11¾	...	...	11½
	1/1¼	...	1/-¼	1/-½	...	...	...	...
Vembenard ...	1/1½	...	1/-	1/-⅛	11¼	...	...	...
Glenmary ...	1/1	...	11½	1/-½	...	...	...	...
Ladrum ...	...	...	1/-¼	1/-¾	...	...	11¾	...
Chenkara ...	1/1	...	1/-½	1/-½	...	...	...	...
Yellapatty ...	...	...	...	...	...	...	...	1/2
Stagbrook ...	1/1	...	1 -	1 -½	...	...	...	...
Kuduwakarnum...	1/1¼	...	1/-¼	1/-½	...	11½	11⅝	1/-
Chulika ...	11¾	...	...	11¾	11½	...	...	...

The Official India Rubber Statistics for the United States show that the following quantities of crude rubber were imported in the year 1915 :—

	lbs.	lbs.
From Belgium	1,902,370	
From France	685,699	
From Germany	739,105	
From Netherlands	313,407	
From Portugal	4,130,624	
From Spain	20,463	
From United Kingdom ...	75,168,236	
Total from Europe		82,960,904
From British Honduras ...	3,088	
From Canada	4,973,436	
From Central America ...	787,280	
From Mexico	1,827,912	
Total from North America		7,591,716
From Brazil	48,753,670	
From Peru	3,154,210	
From other S. American States ...	1,554,180	
Total from South America		53,462,060
From British India	87,804	
From Straits Settlements ...	13,225,775	
From other British Asia ...	10,549,113	
From Dutch Asia, Japan and Asiatic Russia ...	4,079,104	
Total from Asia		27,941,796
From Oceana		3,818
Total from Africa		109,194
Total Imports in 1915 ...		...172,068,428

Of this quantity 6,383,145 lbs. were re-exported leaving 175,685,283 lbs. for consumption in America.

Rubber.

The following are the figures for the Import of Rubber into the United Kingdom for April in Centals of 100 lbs.:—

		1916.	1915.
From Dutch East Indies	...	7,250	877
French West Africa	...	2,273	1,414
Gold Coast	...	3,200	301
Other countries in Africa	...	7,660	6,752
Peru	...	136	1,882
Brazil	...	34,795	34,346
British India	...	6,627	3,885
Straits Settlements	...	62,785	75,568
Federated Malay States	...	30,639	28,702
Ceylon	...	12,765	25,382
Other Countries	...	2,184	2,963
Total Imports	...	170,264	182,072

The following quantities were Re-exported:—

To Russia	...	16,497	17,561
France	...	14,699	17,201
United States	...	39,622	136,038
Other Countries	...	16,582	13,913
Total Re-exports	...	87,400	184,713

Yields in Southern India.

		Rubber in		From 1st January.	
		April.	May.	1916.	1915.
Central Travancore	...	18,237	24,638	56,353	32,345
Malayalam	...	28,942	77,663	176,403	120,844
Mooply Valley	...	...	14,633	41,574	17,496
Rani Travancore	...	64,592	...	...	...
Teekoy	...	...	20,278	27,119	17,015
Kerala	...	...	13,896	43,353	28,050
Pudukad	...	...	10,219	24,864	14,175

Companies.

The Rani Travancore Rubber Co., whose annual report has just been issued has 3,226 acres planted with rubber of which 2,800 acres were in bearing last year. The crop harvested was 750,356 lbs. a yield of practically 268 lbs. per acre. The cost of production f.o.b. Colombo was 10·32*d.* per lb. The estimated crop for this year is 820,000 lbs.

The Pudukad Rubber Co. has also recently issued its annual report. This company has 822 acres planted with rubber of which 653¼ acres were in bearing last year. The crop was 123,481 lbs. a yield of 188 lbs. per acre. This yield was obtained from 88,155 trees, the yield per tree being 1·56 lb.

R. D. A.

INDIAN IMMIGRATION.

Kangani Licences.

LOCAL RECRUITING.

A meeting of the Indian Immigration Committee was held at Kuala Lumpur on May 8th, when there were present :—The Controller of Labour (Mr. J. R. O. Aldworth) Chairman, the Principal Medical Officer, F.M.S. (Dr. C. L. Sansom), the Director of Public Works, F.M.S. (Mr. R. O. N. Anderson), the Hon. Mr. E. Macfadyen, Mr. F. G. Harvey and Mr. J. Mitchell, with the Secretary, Mr. E. W. F. Gilman, Deputy Controller of Labour, Penang.

LATE MR. H. M. DARBY.

The Chairman made a sympathetic reference to the death of the Honourable Mr. H. M. Darby, who for five years had been a member of the Committee,

Mr. Macfadyen also spoke in feeling terms of the deceased member, and on his proposal it was resolved that an expression of the sympathy of the Committee be sent to Mrs. Darby.

ARRIVALS AND DEPARTURES.

The following statement of arrivals and departures of Southern Indians for the first four months of 1916 and during the corresponding period in the 3 preceding years was laid before the Committee :—

ARRIVALS.

	Assisted.		Others.	
	Adult.	Minor.	Adult.	Minor.
1913 ...	15,707	1,233	6,391	455
1914 ...	11,875	988	5,682	340
1915 ...	4,364	291	2,178	141
1916 ...	12,162	1,076	5,389	522

DEPARTURES.

	Adults.	Minors.
1913 ...	27,827	1,347
1914 ...	27,659	1,336
1915 ...	21,429	999
1916 ...	20,996	806

KANGANI LICENCES.

A return was presented showing that the number of kangani licences registered in Penang from January 1st to April 30th was 3,871 compared with 2,082 registered in the corresponding period of 1915 and 3,871 in 1914. During the same period 41 licences were refused in Penang and 129 were cancelled in consequence of reports received from the Emigration Agents in India.

The Chairman mentioned a case which had been brought to his notice where a gang of coolies recruited by a kangani who had never worked on the estate were all giving notice. It was the usual practice to decline to issue licences to persons unacquainted with the work of the estate for which they intended to recruit, and while the Committee thoroughly approved of

this practice it was not considered necessary to make a rule on the subject. It was, however, considered desirable to frame a rule with regard to another matter in connection with recruiting. Some employers have been in the habit of making out licences for very long periods and for numbers of labourers probably far in excess of their real requirements. It was resolved in future to limit the number of labourers which a kangani should be permitted to recruit in first instance to 50 and the period of recruiting licences to six months. When 50 labourers have been recruited the kangani can, if he has been doing good work, obtain an extension from the Emigration Agent in India.

Quarantine Expenses.

A statement of quarantine expenses was submitted and considered showing that the average cost per head at each station for the 1st quarter of 1916 was as follows:—Penang, $2·02; Port Swettenham, $1·10; average $1·57.

Accounts.

Audited accounts for the half-year ending 31st March, 1916, were laid on the table and passed after consideration. The balance of assets over liabilities was $735,371.97.

Arrears had been reduced to the smallest sum at which they had ever stood, *viz*., $11,484.00, of which $5,123.50 had since been collected (up to May 1st).

The Chairman reports the investment of $100,000 of the Fund's balance in the Federated Malay States War Loan, which had been agreed to by circulation of correspondence amongst the members.

New Rates.

It was decided, subject to the consent of H. E. the High Commissioner, to prescribe for the third and fourth quarters of 1916 a quarterly rate of $1·00 to be paid by every employer in respect of every Indian labourer employed or working on the place of employment during the respective quarters. Similar rates are prescribed for the Straits Settlements, and for Johore, Kelantan, Kedah and Perlis. The number of working days prescribed in a quarter for the purpose of calculating this assessment was again fixed at 78 for the next two quarters.

It was decided to pay a recruiting allowance of $5 on account of all labourers recruited by licensed kanganis introduced during third and fourth quarters of 1916.

Singapore.

The question of the inclusion of the Settlement of Singapore within the operation of the Tamil Immigration Fund Ordinance was again discussed and a resolution passed for submission to His Excellency the Governor.

Local Recruiting.

A letter from the Secretary of the Planters' Association of Malaya received that morning was laid on the table. The Committee's favourable consideration was asked to a proposal to raise the fee for the registration of locally recruited coolies to $5·00. This was discussed but no resolution adopted. The Chairman pointed out that it was not a matter over which the Committee had any control.—*The Malay Weekly Mail.*

CORRESPONDENCE.

Spraying for Leaf Disease.

Dear Sir,—At the Conference of Coffee Planters held in Bangalore on the 5th instant it was finally recommended by those present that spraying for leaf disease appeared sufficiently beneficial to warrant its trial over larger areas; and, as I understood, Mr. Anstead recommended that this should be carried out in September and October. At the meeting Mr. Frattini stated that, using the same spray (Bordeaux Mixture), he had sprayed for Black Rot in May, spraying more particularly the stems of the trees of the experimental plot and the fallen leaves lying on the ground below them; that this showed no good effects whatever as regarded black rot during the following rains, but showed a marked effect in mitigating leaf-disease during the following "leaf disease season." Now when is the "leaf disease season"? From the months in which he proposes to spray Mr. Anstead apparently refers solely to the attack which usually appears in December. Now speaking for the districts I know best, *viz.*, the Koppa Taluk and the north-eastern slopes of the Bababudans, I consider there are two main seasons for leaf disease: (1) the monsoon attack that shows up at the end of August or September. (2) the cold-weather attack that usually commences in December.

In the Koppa Taluk, where the S. W. rainfall is heavy, some few years back we expected, and generally got, our attack in August, September. It usually passed off without doing much damage though we fondly asserted it affected the quality of the crop then maturing. If unusually severe it might mean some dying back and loss of crop; but the visible damage passed off with a new flush of leaves in October—November, and the attack was too early to seriously damage the bud, or immature spike, of the "next year's" crop. But on the Eastern slopes of the Bababudans it is quite unusual to get the September attack of leaf disease. In fact coffee in that favoured zone rapidly recovers from the buffeting it gets in the S. West Monsoon and usually looks its very best in September. In seasons when it does get leaf disease the attack comes in December, or possibly January and causes, when there is a heavy crop, dying back and damage to the immature "spike." I am told during the last few seasons that the Koppa Taluk has escaped the Monsoon attack of leaf disease, but has got it in December—January with disastrous effect on the coming crop. Last season, 1915, the attack came in the old way in August—September, there was none in December—January, hence no harm was done to the spike and good crops have resulted.

I suggest from this, and from Mr. Frattini's May experiment, that spraying in September—October would, in certain districts at any rate, be too late; would in fact be shutting the stable door after the horse was out; that the time to scotch the pest is May, and that spraying should be done then. It is very noteworthy that Mr. Frattini did not spray the leaves but only the stems and the ground below the trees with the fallen leaves (mulch) lying thereon; and yet obtained markedly favourable results. I therefore, in the experiments that are to be made over larger areas think that particular attention should be paid to *spraying in May* and suggest that one large area be so treated; and I put this forward as a suggestion for the opinion of practical brother-planters, who have watched these attacks year by year, as well as to Mr. Anstead, Dr. Coleman and Mr. Frattini. I should like to hear from those gentlemen if they have any grounds for thinking it is improbable that the spores attack the leaves in May, though the effect is not apparent in wetter districts till August—September, and in dryer ones till December. As Mr. Frattini did not spray the leaves but only stems,

ground and mulch he must have, if good were done and it was not merely a fluke, attacked and destroyed the spores on their hot weather resting place, presumably the mulch. If this can be established our task in fighting the pest will be very much simplified as it is a far easier proposition to thoroughly spray the mulch and ground than the growing leaves on the trees, nor would any adhesive be required, provided, that is, the spores are destroyed on their resting place before they have settled on the leaves of the plant. Further it would be an easier task for the planter to spray the ground in May than to spray the whole tree when rushed with other work in September and August.

Hoping for a reply from our Scientific Officers.

I am, dear Sir,
Yours faithfully,
H. PILKINGTON.

No. 543/1916. Office of the Dy. Director of Agriculture,
Planting Districts,
Bangalore, 12th June, 1916.

Dear Sir,—In reply to Mr. Pilkington, I take it we have as regards Leaf disease on Coffee three cases ;

(1) An attack which usually takes place in December, usually known as "hot weather leaf disease."
(2) An attack which usually takes place in August, "the monsoon leaf disease."
(3) A double attack, one in August and another in December.

The treatment for these will have to be different. In the first case, which is the most common and is the one which was discussed at the Conference on 5th June, spraying should be done in September. In the second case, which certainly as Mr. Pilkington says applies to particular districts, spraying should be done in May, and it will be advisable to add the Resin Soda adhesive mixture which can be omitted in the September spraying. In the third case, which it is to be hoped is rare, two sprayings in the year are called for, one in May and another in September.

In the second case a complication may arise if Green Bug is present, since the May spraying with Bordeaux Mixture will kill the parasitic fungi which help so much in keeping this insect pest under control. It is then a case of which is the more harmful, Green Bug or Leaf Disease. It is probable that the former is capable of doing the most harm and in that case spraying with Bordeaux Mixture is not advisable at all.

With regard to the efficiency of spraying only the mulch and stems for the control of Leaf Disease I gathered at the Meeting that this was only one of Mr. Frattini's experiments and that though it reduced the leaf disease attack it was not so efficient as spraying the whole plant, but on this point I hope Mr. Frattini will answer the question raised by Mr. Pilkington.

The best time to spray must be decided by the individual planter based on his experience of whether he usually gets Leaf Disease in the hot weather or the monsoon, and when large areas are experimented with this consideration will be taken into account.

THE EDITOR,
Planters' Chronicle.

Yours faithfully,
RUDOLPH D. ANSTEAD,
Deputy Director of Agriculture, Planting Districts.

The Planters' Chronicle.

RECOGNISED AS THE OFFICIAL ORGAN OF THE U. P. A. S. I., INCORPORATED.

(Secretary's Registered Telegraphic Address "Planting," Bangalore.)

VOL. XI. No. 26.] JUNE 24, 1916. [PRICE AS. 8.

THE U. P. A. S. I.

(INCORPORATED.)

Contents.

The Proceedings of the North Mysore and Wynaad Planters' Associations are published.

An account of the afternoon session of the Conference of Coffee Planters is continued and some interesting manurial results are given.

Through the courtesy of the Rubber Growers' Association, who have released it for publication, we print a special circular entitled A Rapidly Vulcanising Rubber, which will interest all rubber planters, and will we hope lead to correspondence.

We publish some interesting letters on Spraying for Leaf Disease, the result of the Coffee Planters' Conference.

The Director, Labour Department, went to Coimbatore on the 23rd instant and will return on July 1st to Bangalore. He has asked us to publish the following for the information of subscribers:

"Mr. A. L. Alexander will be in charge of the Deputy Director's division of the Labour Department with his headquarters at Coimbatore for three months certain from 1st July. Registered telegraphic address 'Upasi' Coimbatore. Subscribers to the Department please note."

SOUTH INDIAN PLANTERS' WAR FUND.

	Rs.	A.	P.
Amount previously acknowledged	44,914	12	8
Mr. R. Ainsworth	25	0	0
Mr. W. A. J. Milner	20	0	0
Mr. W. H. G. Leahy	20	0	0
Mr. N. Waddington	30	0	0
Mr. R. N. Crowther	10	0	0
Total...	45,019	12	8

OVERSEAS AIR CRAFT FUND.

Balance	95	0	0

DISTRICT PLANTERS' ASSOCIATIONS.

North Mysore Planters' Association.

Proceedings of the Quarterly General Meeting held at Balehonnur, on the 7th June, 1916.

PRESENT.—Messrs. W. H. Reed (President), C. Danvers. C. S. Crawford, F. W. Hight, G. V. R. Frend, and C. C. Kent (Honorary Secretary). *By proxy*: Messrs. S. L. Mathias, C. Godfrey, R. G. Foster and F. Morgan.

PRINTED FORMS OF AGREEMENT FOR COOLIES AND MAISTRIES.—It was noted that the Director of the Labour Department was preparing a form of agreement for coolies and maistries suitable under Act XIII. In the meantime the Honorary Secretary be requested to write to the Deputy Commissioner informing him of the desire of the Association to have stamped papers printed with a form of agreement between planters and maistries, and maistries and coolies, and asking whether difficulties would arise from the names of the contracting parties not being those of the original purchaser of the stamped paper, which would be that of the Association.

ROADS.—BALEHONNUR-MAGUNDI-BALUR ROAD.—Read letter from Superintendent, Northern Circle, and it was noted that the widening of the above road was under consideration of the Government, the Honorary Secretary was instructed to write a reminder to the Superintending Engineer.

HANDI-ALDUR ROAD.—Read letter from Mr. L. P. Kent, District Board Member. The Honorary Secretary was requested to ask him whether the matter of alloting Rs. 10,000 worth of Local Fund roads to the Provincial Fund had been put through.

SANDERSON WARD STORE ROOM.—Read letter No. 22 of 25-4-16 from the Civil Surgeon, Chickmaglur. It was resolved "that this Association should subscribe the Rs.150 required to make up the balance of Rs. 500 to be subscribed by the planters, provided the Government will subscribe the promised balance necessary to put up a store room for the Sanderson Ward."

ASSISTANT SCIENTIFIC OFFICER.—In view of the poor attendance at this meeting it was proposed by Mr. C. Danvers and seconded by Mr. Hight "That as Government is taking over the Scientific Department as soon as funds are available, it would be inadvisable to make a long agreement with the Assistant Scientific Officer, and that under these circumstances he be asked to remain, on the completion of his present term on a yearly agreement until Government is able to fully organise the new Department, and that members of the Association be asked their opinions on this by post cards on receipt of which the Assistant Scientific Officer may be approached through the Council and ascertain if he will agree to these terms."

DELEGATE TO THE U. P. A. S. I.—Mr. W. H. Reed was elected to represent the Association.

DELEGATE TO DASSARA.—Mr. E. W. Fowke was elected. Members were requested to inform the Honorary Secretary as soon as possible of any subjects they wished brought before the Representative Assembly at Mysore.

ELECTION OF PLANTING MEMBER.—Mr. E. F. Barber was elected.

MYSORE CHAMBER OF COMMERCE.—Mr. L. E. Kirwan's nomination was confirmed.

EXPERIMENTAL COFFEE STATION.—It was resolved "That Santikoppa would be preferable to Sanwarasante for the proposed experimental coffee station."

At the close of the meeting the President and Honorary Secretary submitted their resignations.

The following were elected:—

Mr. C. Danvers	...	President.
Mr. W. H. Reed	...	Honorary Secretary.

(Signed) W. H. REED,
Honorary Secretary.

Wynaad Planters' Association.

Proceedings of a General Meeting held at Meppadi Club, on June 14th, 1916.

PRESENT.—Messrs. Bisset, Blackham, Copland, Gillatt, Leslie, Malcolm, Morres, Powell, Stewart, Vernede, Whitton and Abbott, Honorary Secretary. Mr. Whitton in the Chair.

2230. The Chairman proposed a vote of regret and sympathy with the relatives of Mr. P. C. Guard who was for many years a member of this Association and died on May 23rd, and of Mr. W. V. Hudleston who was Honorary Secretary of this Association as long ago as 1875 and died on June 13th. Passed all members standing.

2231. MAGISTRATE AT POOTOOMULLA.—The Vayitri Magistrate has arranged to visit Pootoomulla every month. Noted with satisfaction.

2232. ROOT DISEASE IN TEA.—Members present said (ref. para 2227) that they had not found any specimens of the hymenochaete noxia. Anyone who does is asked to inform Mr. Anstead.

2233. ELECTION OF PLANTING MEMBER.—A ballot having been held the Chairman announced that Mr. J. A. Richardson of Peermade was elected.

2234. U. P. A. S. I. MEETING.—Read preliminary draft of Agenda. No suggestion for any addition was made. The matter will be further considered at the next Meeting.

Messrs. Whitton and Abbott were elected Delegates and Rs. 150 each was voted for their expenses.

2235. INCOME TAX ON TEA FACTORIES.—Read correspondence, ending with a letter from the Secretary U. P. A. S. I. dated 10th June stating that he has been informed by G. O. that the proposal has been dropped.

2236. COCA IN WYNAAD.—Read correspondence between Messrs. Peirce, Leslie and Co., the Honorary Secretary and the Assistant Commissioner, Salt and Abkari Department, who has ordered all coca plants on Mr. Mackenzie's Mangalacarp Estate to be uprooted.

Resolved that as the matter has been referred to Mr. Mackenzie in England the Association waits his decision.

2237. DESPATCH OF MAILS FROM MEPPADI.—Read letter to Postmaster-General asking that the former hour of despatch of mails be restored as the Police consider the road quite safe, and reply stating that enquiries are being made. The Honorary Secretary was instructed to say that we hope our request will be acceded to at an early date as the present early hour of closing is a great inconvenience.

2238. SULTANS BATTERY TELEGRAPH OFFICE.—The Honorary Secretary was instructed to write to the Postmaster-General Telegraphs asking when it is proposed to open this office. The wire connection has been made for several months.

2239. MEPPADI CHERAMBADI TELEGRAPH.—A member complained that it took 3 days for a telegram to reach him from Nellakotta. Various other complaints were made of great delay: these are attributed to the Meppadi—Cherambadi wires being disconnected, and telegrams between these two places which are only 12 miles apart being sent *via* Calicut and Ootacamund.

The Honorary Secretary was asked to enquire, if this is the fact, to have this link restored.

2240. PROPOSED AMENDMENT OF THE LABOUR LAW.—Read letter from Honorary Secretary to Collector of Malabar dated March 23rd, informing him of the resolution passed at the last Meeting. In reply to an enquiry, the Collector wrote on June 9th, to say that he had received no further communication from Government since forwarding the Association's views. The Honorary Secretary was asked to endeavour to find out what Government intends to do, as the matter is one of great importance.

It is noted that the Nilgiri Planters' Association has passed an identical resolution to ours.

2241. ROADS.—Read letter from Honorary Secretary to the District Board Engineer about clearing jungle from the sides of Road 38, and his reply stating that the work would be put in the hand.

2242. TEA PASSES.—Attention was called to the advisability of having these properly numbered and returned from Calicut.

A vote of thanks to the Chair terminated the Proceedings.

(Signed) N. C. WHITTON,
Chairman.

(,,) C. E. ABBOTT,
Honorary Secretary.

Note.—The next Meeting will be held on July 5th.

A CONFERENCE OF COFFEE PLANTERS.

At the afternoon session the first subject considered was the Manuring of Coffee. The results obtained during the last three years on the four Experiment Plots in Mysore were presented. It was pointed out that these must only be considered as progress reports as it is necessary to continue such experiments over a long series of years in the case of Coffee to obtain any reliable results. The factor of climate is such an important one that in a good or bad year it tends to level up manured with unmanured plots to such an extent that the latter often turn out as good results as the former. This was the result obtained by Dr. Lehman some years ago and it has again occurred in some of the Experiments and the results to date are reported here. The Arabidacool Plot shows more marked differences. The other three experiments were designed to throw light on the best qualities of any given general fertiliser to apply. They tend to show that small qualities produce as good results as larger ones. The Experiments are to be continued and it is hoped that when they have been running for a number of years that they will afford more definite results than they do at present.

Mr. Anstead stated that his experience of Coffee manuring confirmed his opinion that a double application of manure in the year was the best, and speaking quite broadly he advocated an application of Potash either all before the monsoon or half before and half after; Phosphoric acid half before the Monsoon and half after, the latter application in an available form: Nitrogen either before the monsoon as organic or after the monsoon in a rapidly available form.

It is however impossible to lay down any hard and fast rule for Coffee Manuring. Each estate should be considered on its merits, and the various factors like past manurial treatment, rainfall, soil analysis, &c. taken into account. A regular system of manuring over a period of five years or so based on these considerations is advised. A number of estates have adopted this plan and it is proving a success. As a typical example Mr. Anstead cited one estate which adopted a manurial system based on a soil analysis and which to date has given the following satisfactory result. Area is 50 acres.

Year.	Crop.	Cost.		
		Manures and transport.	Application.	Total.
	Tons.	Rs.	Rs.	Rs.
1910-11 ...	9	1,150	75	1,225
Manurial System began.				
1911-12 ...	$9\frac{1}{2}$	1,770	100	1,870
1912-13 ...	18	2,597	140	2,737
1913-14 ...	$12\frac{3}{4}$	2,320	126	2,446
1914-15 ...	$6\frac{1}{5}$	1,580	131	1,711
1915-16 ...	8	1,200	50	1,250
Total ...	$54\frac{2}{5}$	...	...	10,014
Average ...	$10\frac{2}{10}$	...	...	2,003

This period has included two exceptionally bad years and in addition the War has upset the scheme owing to the inability of getting the fertilisers required and the necessity of cutting down expenditure to a minimum.

Arabidacool

Plot.	No of trees.	Area.	Manure.	When applied.
1	771	0·442	2. Poonac. 2. Bone Meal. 1. Muriate Potash.	
2	790	0·453	2. Poonac. 2. Bone Meal. 1. Sulphate Potash.	
3	846	0·485	2. Basic Slag. 1. Muriate Potash.	
4	748	0·429	2. Basic Slag. 1. Sulphate Potash.	
5	867	0·497	3. Bone Meal. 1. Saltpetre.	Pre-monsoon application.
6	818	0.469	5. Basic Slag. 3. Sulphate Potash. 4. Nitrolim.	
7	805	0·462	5. Basic Slag. 3. Sulphate Potash. 4. Nitrate of Lime.	
8	961	0·551	15. Bone Meal. 8. Muriate Potash. 9. Nitrate Lime.	
9	813	0·466	15. Bone Meal. 8. Sulphate Potash. 9. Nitrate Lime.	
10	772	0·443	NO MANURE.	

Experiment Plot.

Crop.	Weight per bushel.	Yield of clean Coffee per acre.
13-4. 2004' 5 lbs.	50 75	7'62 cwts.
14-5. 1123' 5 lbs.	51' 0	3'51 cwts.
15-6. 1641' 5 lbs.	50' 5	6'89 cwts,
		Average. 6'01 cwts.
13-4. 2004' lbs.	50'55	7'02 cwts.
14-5. 1564'75 lbs.	51'25	5'07 cwts.
15-6. 1163' lbs.	51' 5	4'40 cwts.
		Average. 5'49 cwts.
13-4. 1908' 5 lbs.	50' 5	6'08 cwts.
14-5. 1479' lbs.	52'25	4'27 cwts.
15-6. 1424'75 lbs.	51'75	5'06 cwts.
		Average. 5'14 cwts.
13-4. 1569' lbs.	51' 0	5'46 cwts.
14-5. 1079'75 lbs.	51'75	3'47 cwts.
15-6. 1314'75 lbs.	51' 0	5'71 cwts.
		Average. 4'91 cwts.
13-4. 1769' 5 lbs.	51' 0	5'92 cwts.
14-5. 1504'75 lbs.	50' 5	4'28 cwts.
15-6. 1314' 5 lbs.	51' 5	5'10 cwts.
		Average. 5'10 cwts.
13-4. 1866' 5 lbs.	50' 5	6'15 cwts.
14-5. 1326' 5 lbs.	51'25	4'06 cwts.
15-6. 1370' 5 lbs.	51'25	5'33 cwts.
		Average. 5'18 cwts.
13-4. 2265' lbs.	50' 5	7'42 cwts.
14-5. 901'75 lbs.	51' 5	2'84 cwts.
15-6. 1147'25 lbs.	51' 0	4'73 cwts.
		Average. 4'99 cwts.
13-4. 2252' lbs.	50' 0	6'56 cwts.
14-5. 977' 5 lbs.	51' 5	3'22 cwts.
15-6. 1380'25 lbs.	50' 5	3'93 cwts.
		Average. 4'57 cwts.
13-4. 1925' lbs.	50' 5	6'53 cwts.
14-5. 1155'25 lbs.	51' 5	3'58 cwts.
15-6. 1034'25 lbs.	51' 0	3'26 cwts.
		Average. 4'46 cwts.
13-4. 1766' lbs.	50'75	5'91 cwts.
14-5. 1253' 5 lbs.	50' 0	4'09 cwts.
15-6. 613' 5 lbs.	51' 0	2'07 cwts.
		Average. 4'92 cwts.

THE RUBBER GROWERS' ASSOCIATION.

(INCORPORATED.)

38, Eastcheap,
London, E. C.,
12th April, 1916.

The special attention of members is drawn to the following report by the Association's Consulting Chemists:—

A Rapidly Vulcanising Rubber.

In a recent issue of the *Agricultural Bulletin of the Federated Malay States* (Vol. IV., No. 2, of November, 1915, p. 30), there appears an article by one of the staff, entitled "Preliminary Note on a New Rapidly Vulcanising Rubber." This article deals with experiments in which the coagulated rubber is treated with caustic soda, sodium carbonate or lime. It is stated that the rubber so treated cures rapidly, and the writer concludes "It is possible that a rubber of this type may be of considerable value commercially, in view of the remarkably rapid rate at which it vulcanises."

It is, however, a known fact that even small quantities of alkalies or lime have a profound effect on the vulcanisation of rubber, and the North British Rubber Co., have addressed a letter to your Association to this effect. They state that the use of alkali might result disastrously for those planters who might adopt it, on account of the changes which ensue in a short period of time in the vulcanised samples to which alkali has been added. They state that, sooner or later, perishing almost invariably sets in, and in fact, the whole practice is an extremely dangerous one. The North British Rubber Co. fear that the publicity of the Bulletin amongst planters and the remarks at the end of the paper that the addition of alkali may give a type of rubber of considerable commercial value, might prompt certain planters to adopt the use of alkali on their Estates, and that this at a later date would come home to them to their discredit.

Members of the Association who have subscribed to the Research Fund will already have been informed of the danger of treating rubber with caustic soda. A reference to the 17th Malaya Report p. 13 will show that we stated that manufacturers would certainly take objection to rubber in the preparation of which caustic soda and lime were employed. Further tests we have made prove the deterioration referred to by the North British Rubber Co., and details of these tests will be published in our report to the Association. *Members are therefore advised on no account to treat their rubber with caustic soda or other strongly alkaline substances.*

CLAYTON BEADLE & STEVENS.

CORRESPONDENCE.

THE EDITOR,
Planters' Chronicle.
Bangalore,

Spraying for Leaf Disease

Sir,—Mr. Pilkington in your issue of the 17th instant has opened what I think should be an interesting and instructive discussion. I am just starting on a journey and have no time to write fully, but will jot down the outlines of my impressions and experiences.

Firstly, Leaf Disease seems never to be entirely absent now-a-days, but comes sometimes once and sometimes twice a year in big outbreaks, according to the character of the season. It may come in August—Sept. *and* December—January; it may come only in August—September, *or* in December—January, or it may not come at all. During the last 2 seasons I have had it both times, worse in December—January, which is as Mr. Pilkington says the time of greatest loss.

When I saw Mr. Frattini's experimental plots last November, I was chiefly struck with the one he mentions as having been sprayed only on stems and mulch, the results appearing finer, as regards L. D., than on any of the others; and on my way home I thought furiously—for, during the previous April and again in September, I had put some inches of *earth* (not "jungle soil" for I had none) over a partially-separated field of 7 acres, and this had had only specks of L. D. though the rest of the Estate was attacked as usual. (This almost immunity has continued up to now). I came to the conclusion that Mr. Frattini's experiment and my soiling had done the same thing—smothered in one case, destroyed chemically in the other, the L. D. spores on the ground and in the mulch.

I believe at present that spraying the bushes themselves is not entirely necessary, though no doubt it would considerably help; but it is a very troublesome and difficult work over any extended acreage, and certainly one spraying in August-September does not appear to be sufficient, considering the rapid growth of new wood then and after, which would be unprotected by a single spraying. I do believe though that we ought to experiment further with the ground and mulch, burying the latter as often as possible, liming it, spraying it, smothering it, generally strafeing it, as the L. D. spores seem to me to lie up in the mulch.

This would be simpler than spraying the bushes and a combination of spraying near water and smothering far from water would be a cheaper procedure than entire spraying. This mulch-spraying and smothering would also obviate the probability of disturbing the Green Bug fungus at its beneficent work, a point Mr. Anstead has so rightly insisted on.

I think we should go back, those of us who have not yet done so, to our old methods of clean digging (where advisable) and renovating, taking every possible opportunity of strafeing the L. D. spores. Spray where you can't smother, and smother where you can't spray. Forking and other rough digging is no use for this. Nothing I suppose will get rid of Leaf Disease, but smother, spray, spray, smother at every available opportunity should go far towards reducing it to comparative impotence. We shall lose the mulch as mulch, which many of our souls love, but we can't have

everything. The cost of any extra work of this kind would be returned I think in the reduced amount of manure which it would be necessary to provide for bushes which had been enabled to keep their health and strength through absence of L. D.—for I have always held that the amount of manures we apply now is chiefly needed for bucking up bushes attacked by this vile disease, and not from any great absence of plant food in the soil. We have to provide pap for invalids.

I must ask your and your readers' indulgence for a rough letter, as I have no time—and I shall look forward to seeing other opinions and experience in future issues, merely adding, that if Mr. Frattini's experiments lead to any sensible reduction of Leaf Disease, the Scientific Department will have justified its existence a thousand times, over this one thing.

Yours faithfully,

C. DANVERS.

Ootsey, Mudigere P. O.,
Kadur District,
21—6—1916.

To

THE EDITOR,
Planters' Chronicle,
Bangalore.

Spraying for Leaf Disease.

Dear Sir,—Referring to Mr. Pilkington's letter in your issue of the 17th instant, under this heading I quite agree with him that the time to "scotch" the pest is apparently in May.

The advantages of spraying in May are greater than those obtaining in September-October. In the first place by spraying in May it not only serves the purpose of checking Leaf Disease, but also Black Rot. Also when spraying in September—October the trees have much denser foliage than in May and consequently more spray-liquid is required per acre.

I also agree with Mr. Pilkington that in certain districts spraying in September-October would be too late; but I would add not only in certain districts but in every district in certain seasons. I have known an outbreak of Leaf Disease begin in July in which case a September-October spray would hardly be of use. Also a severe August outbreak is quite common.

At the Coffee Planters' Conference held in Bangalore on June the 5th, a discussion arose regarding the ill-effects of Bordeaux Mixture on the parasitic fungi of Green Bug. I was about to make a few remarks on the subject, but was not given an opportunity of doing so.

Last year in May 1915 I sprayed 40 trees with Bordeaux Mixture which were badly infected with Green Bug, with a view to ascertaining what effect it would have on the parasitic fungi during the monsoon, and it was sur-

prising to note that after the monsoon set in in June the fungus appeared on these sprayed trees in just as large a quantity as the surrounding unsprayed trees.

It is also of interest to note that the experimental plots which were sprayed in May of this year are all infected with green bug, and one or two of them rather badly. On visiting these plots a few days ago both of the fungi were hard at work, and in abundance.

From this I do not wish it to be understood that the Bordeaux Mixture does not kill the fungus when it comes in contact with it. Bordeaux mixture is essentially a Fungicide, and Dr. Coleman in his address mentioned that in his opinion " it is certain to prevent the development of these two fungi;" but what I wish to maintain is that judging from my experiments *one* spraying does not appear to be sufficient to seriously prevent its development during the monsoon.

Of course what the general effect would be when spraying large green bug infected areas remains to be seen. It may be that the present experimental plots being of such small size (200 trees) and in close proximity to other trees which are infected with the fungus: that they become easily reinfected again. On the other hand when very large acreages are sprayed it may possibly prevent the fungus from making any headway for some time afterwards. No doubt before very long this important point will be proven.

Mr. Pilkington's other point as to whether it is "improbable that the Leaf disease spores attack the leaves in May, though the effect is not apparent in wetter districts till August—September, and in dryer ones till December," this is a question that Dr. Coleman could answer more effectively.

Regarding my experiment in which I sprayed the mulch on the ground and stems of the trees only; it has been my opinion of some time past that the mulch on the ground is a regular hot-bed of infection and the above experiment has further strengthened my opinion on this point. By spraying the mulch and the stems of the trees only the Bordeaux Mixture would not kill the spores themselves; but it would kill the germ-tubes on the germination of the spores.

I quite agree with Mr. Pilkington that spraying the mulch and stems of trees is far more practical and easier of accomplishment than spraying the whole tree.

Before closing I would like to correct a remark of Mr. Anstead's in his letter replying to Mr. Pilkington. In the fourth para of his letter he states " With regard to the efficiency of spraying only the mulch and stems for the control of Leaf disease I gathered at the Meeting that this was only one of Mr. Frattini's experiments and that though it reduced the Leaf disease attack it was not so efficient as spraying the whole plant." These remarks were made in connection with Black Rot and *not* Leaf disease. With regard to Leaf disease this method of treatment proved the most successful.

There is one other point in Mr. Anstead's letter to which I would like to draw attention. He states: " It is then a case of which is the most harmful, Green Bug or Leaf disease. It is probable that the former is capable of doing the most harm, and in that case spraying is not advisable at all."

I beg to differ with Mr. Anstead on the point of the probability that Green Bug is capable of doing more harm than Leaf disease. Speaking for Mysore I think I am right in saying that there is not one Planter who can positively state that up to date he has had more harm done by Green Bug than by Leaf Disease.

For anyone who has seen the ravages committed by a bad attack of Leaf disease it is hard to imagine anything worse. The trees are practically denuded of leaves; crop can be seen lying on the ground, and all the best wood either killed off or dying back. After the attack the trees are so weakened that they take fully two years to recover. On the other hand with regard to Green Bug the trees also when badly attacked lose their leaves and a little crop; but the redeeming feature is the marvellous rapidity with which the trees recover immediately a check is put upon the pest either by spraying or by the parasitic fungi which appear in the monsoon, and in the dry weather.

Yours faithfully,

G. N. FRATTINI,
Scientific Assistant for Mysore.

Bettadmane Estate,
Mudigere P. O., Kadur Dist.,
June 22nd, 1916.

THE EDITOR,
Planters' Chronicle.
Bangalore.

Sir,—With reference to the correspondence now going on in the *Chronicle re* Spraying with Bordeaux Mixture the result of a small experiment which I carried out in May 1915 may be of interest.

In a small patch of coffee were 3 or 4 trees badly infected with Green Bug. I stopped my coolies from spraying this with resin soap mixture and instead did it with Bordeaux for the purpose of finding out how far the Bordeaux would stop the fungus that kills off green bug during monsoon.

The result was (1) That the Spraying with Bordeaux killed off a certain amount of green bug not to the same extent as resin soap mixture (2) While Fungus appeared shortly after the burst of monsoon and did its work so thoroughly that there has been no bug on these trees during the last year. (3) The fungus appeared on the trees sprayed with Bordeaux some 2 or 3 weeks before it did on those that were sprayed with resin soap mixture at the same time.

There is another point which so far I have not seen mentioned, which is that geeen bug is now on some of our shade trees. These would breed fungus and be out of reach of the spray and in a most suitable position to reinfect bug on the coffee below.

Yours truly

M. J. WOODBRIDGE.

The Planters' Chronicle.

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(Secretary's Registered Telegraphic Address "Planting," Bangalore.)

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THE U. P. A. S. I.

(INCORPORATED.)

Contents.

We have, from pressure of space, unavoidably had to hold over until next week the proceedings of the Coorg and Nilgiri Planters' Associations.

We conclude in this issue the account of the Coffee Planters' Conference which has produced many letters, arising out of the matters discussed at it, and giving the results of personal experience which will be invaluable in solving the best method of checking those two fell diseases—Leaf Rot and Leaf Disease. So successful has the late conference been in inducing planters to overcome their literary lethargy and make use of our columns, that we hope that, Tea and Rubber Conferences will take place eliciting invaluable expressions of opinion from practical planters.

R. D. A. furnishes a statement on Markets, Prices and Statistics.

We would specially draw attention to the correspondence. A letter is published from Sir J. D. Rees to Messrs. Rowe, White & Co., on the Double Export Tea Duty, kindly supplied by Mr. J. A. Richardson, whose own letter to us should be carefully read as it removes a mistaken idea that there was any opposition to the re-election of the Hon'ble Mr. E. F. Barber.

Dr. Coleman has very kindly placed at our disposal some correspondence between himself and Mr. Hunt on spraying, which topic also is written about by Mr. Lake.

SOUTH INDIAN PLANTERS' WAR FUND.

	Rs.	A.	P.
Amount previously acknowledged	45,019	12	8
Mr. B. Hartley	75	0	0
Mrs. W. A. Asher	50	0	0
Mr. H. C. Westaway	150	0	0
Mr. K. H. Lysons	40	0	0
Mr. J. M. Wilkie	60	0	0
Messrs. Barber and Parsobe	75	0	0
Total...	45,469	12	8

OVERSEAS AIR CRAFT FUND.

Balance	95	0	0

A CONFERENCE OF COFFEE PLANTERS.

The third subject discussed at the Conference was, the Improvement of the Strain of Coffee in Southern India. In introducing this subject Mr. Anstead said that it seemed to be generally agreed that the Coffee was as a whole steadily deteriorating and that each year more and more difficulty was experienced in raising good supplies. This was scarcely to be wondered at when it was remembered that the same strain had been grown for forty years or more and when so little care was taken in selecting the seed which was sown in nurseries.

He was of opinion that more could be done by careful seed selection from the existing Coffee than by introducing seed from other Coffee growing countries. While he did not wish to pour cold water on this scheme he would point out that there were many things in the way of its being likely to prove a success. In the first place seed of a great many varieties had already been tried, Marigogipe, Blue Mountain, Robusta, Stenophylla, &c., and none had so far proved a success. Most of the Coffee producing countries grew *Arabica* and sent seed which was in no way selected, and large quantities would have to be imported if anything was to be done in the way of replacing the present strain grown in India. In fact it would be necessary to raise the plants from such seed and select from them.

Mr. Anstead said he thought that very good results could be obtained from what we had already got, if seed selection was undertaken in a scientific way. The best known existing trees of different types of Coffee should be selected in the first place, netted at blossom time, and the seed from them planted in special nurseries. The resulting plants should be examined and only the best selected and planted out and used as seed bearers.

In the Dutch East Indies some very successful work was done on these lines some years ago. There it was found that the ordinary methods of selection such as the actual weight, or specific gravity, of the seed did not give the best results. These were obtained by selecting good trees, sowing the seed from them and choosing the tree which gave the most vigorous and productive descendants. The characters of the selected seed bearers were studied in detail and their average values calculated according to the methods of Galton and Quetelet, and in this way a number of varieties were obtained which came true to type.

Work along these lines is needed in South India but it is work which the planter himself cannot do for a number of reasons and it should be done by the Agricultural Department on special stations. Possibly the Scientific Department of the U. P. A. S. I. might take it up if facilities were given them, but these facilities included staff and the appointment of specially trained men to undertake the work.

Much more might be done with Hybrid Coffee. Some good Hybrids existed in South India and not enough was made of them. Mr. A. H. Jackson of Coorg was getting some excellent results from his Hybrids as the following letter, which he had kindly given permission to publish, showed:—

"In February 1914 I put down a small nursery of about 800 seeds from the 6th generation trees. In September 1914 the plants from these seeds which were nice 8 leaved seedlings, grown in baskets, were planted out in the field by my son Howard, who was in charge whilst I was in England. No selection was made in the Nursery, all plants that grew were planted, in all about 700. With the exception of 4 or 5 trees all have come true to the type (my ideal tree) and all are fertile.

"This small clearing was made in most wretched land, both with regard to soil, and aspect. The soil is exceedingly poor, and the aspect is due East, just on the edge of a Paddy field. This site had to be used as no other isolated spot was available.

"The trees made a most wonderful growth, many of them were 4' 6" high by the end of November 1915, they were all cut down to 2' 6". The best trees average 10 to 11 pairs of primaries at this height.

"Towards the end of March we had a few small showers the best being, 25 cents, which brought out the blossom. There were two blossoms, about half came out each time.

"The clearing is planted with 'Lithosperma,' otherwise it is in the open, as the other shade trees are very small. Where the coffee trees are a little sheltered, the blossom has set splendidly. Many of the trees must have quite 2,000 berries on them. I counted the berries on one tree yesterday, which I considered to be an average one, but not the best in the field (I mean the average of the trees which are sheltered) and found it had 1799 berries on it, about the size of No. 1 shot, anything smaller was not counted. You can calculate yourself what 1799 berries per tree would represent per acre on Coffee planted 6' x 6', I make it about 15 cwts. per acre. These trees will not have been in the field two years till next August.

"Up to date each generation of my Hybrids has been immune from Leaf Disease. As to the quality of the Coffee, this remains to be seen. I can only tell you that the London reports were unsatisfactory till the 5th generation, the sample from this was reported on as equal to the average Coorg Coffee. To look at the trees, you would class them as most robust 'arabica' trees.

No manures had been applied to the trees till last week, when I gave them cattle manures, on realizing the crop they had on them. The only tillage the soil has had is one digging after planting and clean weeding."

In conclusion Mr. Anstead expressed the opinion that it would pay the Coffee planters to appoint a trained Economic Botanist to study the life History of the Coffee plant and on a special station to breed new types. This would of course take time but the sooner it was undertaken the better.

At present how much care was taken about the selection of the seed put down? What sort of parents did it come from? What was their history and pedigree? What sort of bushes is the seed *likely* to produce? These are the kind of qusstions which ought to be asked and answered before any seed is chosen for making nurseries. In ordinary estate practice how often was this done? One is sowing a seed to produce a tree which is to live and give a profit over a period of 20-40 years. Surely it is common sense to take every precaution and care that the seed is a good one and likely to produce a tree which will fulfil the destiny marked out for it.

In the discussion which followed Mr. Anstead's remarks the following points were brought out:—

(*a* That Hybrid Coffee gave somewhat variable results, but that undoubtedly it deserved a good deal of attention. As a rule it fetches a price below that of good average Mysore, but to set against this it bears heavily and produce a large proportion of Pea Berry, and it is to a great extent disease resistant.

(*b*) Robusta Coffee in some localities does well and it should have a good trial. It however, despite what is often published about it, suffers badly from Leaf Disease and Green Bug.

(*c*) Selection of seed is no doubt the right line to adopt, but it will never be undertaken by the planters themselves. It must be done by the Government on Agricultural Stations. What is primarily wanted is something to take the place of worn out Coffee now, and not an improved strain for the benefit of posterity. Work of this kind however must to a large extent be done for posterity and Dr. Coleman urged this point of view and stated that the work must be undertaken by a man of exceptional ability, if it is to attain any measure of success.

The following conclusions were reached and subscribed to the members present as a result of the discussion :—

That better results can be obtained by selection and breeding methods with existing types of Coffee than by importing seed of *Arabica* or other varieties from other countries.

That the results so far obtained with Hybrids in South India justify further work and trial with this class of Coffee.

That selection methods on a systematic scale are absolutely necessary.

A Fly Destroyer.

H. Maxwell-Lefroy (Curator of the insect house at the London Zoo) at Fly Farm, Middlesex, would appear to have solved the problem of a cheap and effective trap. This experiment has tried every imaginable bait, from strange chemicals to beer and bananas, and he has at last found the ideal bait that fills his bottle traps full of flies. It is casein, brown sugar, and water mixed in equal parts. This mixture must be left to stand for twenty-four hours or so before a fly will take much notice of it. Then some slight change sets in, due no about to fermentation, and from that moment it will not be kept away. Some subtle smell about the mixture appeals to house-fly taste, and they surge anxiously round the bottle, looking for the way in½ Casein as you know, is the chief solid in milk, the curd from which cheese is made. It can be obtained by scouring the milk, or by the use of rennet, as employed by cheesemakers. It may be worth mentioning that the slime left in the bowl of the separator consists largely of casein, and as this is entirely a waste product it might well be tried first in combination with the sugar and water as a bait for the flies.—*Queensland Agricultural Journal.*

Prussian Tea-Kultur.

A correspondent of the *Morning Post* contributes an interesting article to that journal of the subject of the expedients resorted to by the Prussian Government to find substitutes for "Chinese, Japanese and other Asiatic tea," the price of which is now prohibitive to all but the wealthy. A Prussian Government communication draws attention to the advisability of Germans using German tea, which is made from the dried young leaves of the Strawberry, Blackberry, Whortleberry, Black Currant, Raspberry, Cherry, Birch, Elm, and other trees. The official communication states—perhaps unnecessarily—that the tea brewed from this blend has a far more varied taste than that of "Asiatic tea.—*The Gardeners' Chronicle.*

MARKETS, PRICES, AND STATISTICS.

Coffee.

Monthly Statistics to 31st May.

		1916. Tons.	1915. Tons.
East Indian.			
Landed to 31st May	...	1,930	2.385
Delivered to 31st May	...	937	1,926
Stock on 31st May	...	1,879	1,918
Coffee of all kinds.			
Stock in U. K. on 31st May	...	33,000	20,800
Total European imports to 31st May.		178,700	264,650
Total European deliveries to 31st May		179,415	258,065
Total European stock on 31st May.		205,590	262,410
World's visible supply on 31st May.		457,470*	484,410

* A decrease of 35,530 tons compared with a decrease of 43,470 tons last year.

Brazil receipts to 3rd June.

1916.	1915.	1914.
14,334,000.	12,410,000.	13,993,000

Offerings at auction have been :—

—	16-26 May.	Total since 1st Jan.	Last year.*
East Indian ...	5,427	21,774	17,629
Costa Rica ...	8,726	72,883	62,926
Other Milds ...	1,986	52,156	81,962
Brazil ...	11,230	44,510	58,389
Robusta ...	44	627	10,525
B. E. A. & Uganda ...	—	7,322	7,351

* To 14th May only on account of Whitsuntide holidays.

The following prices have been obtained for South Indian coffee :—

—	No. 1.		No. 2.		No. 3.		PB.		T.		Extra.
MYSORE.											
Cannon, M. ...	50	82/-	38	75/-	9	70/6	9	N.	13	68/6	
Santawerry ...	43	N.	18	74/6	2	67/-	7	80/-	10	69/-	
Oliver's, K. ...	29	N.	17	80/-	3	68/-	6	87/-	4	70/6	
	59	N.	27	78/6	2	68/-	9	88/6	4	70/-	
Engadine ...	16	N.	24	74/6	13	70/6	6	80/-	8	68/-	
Maynard's, DK...	9	85/6	12	78/6	...	...	4	86/-	...	...	
Maynard's, 1& ...	10	84/-	18	78/-	...	...	7	88/-	...	...	
K. TT. ...	37	81/-	33	75/6	10	71/-	18	95/-	10	69/-	
Yellagode ...	14	N.	15	72/6	6	69/6	5	N.	5	66/6	
Mavinkere ...	34	N.	20	N.	4	67/-	7	N.	9	67/-	
	43	N.	19	N.	4	67/-	7	N.	6	67/-	
Attikhan ...	20	79/-	19	75/6	1	69/-	2	76/-	3	67/6	
Honnametti ...	11	76/-	14	73/-	2	67/-	2	75/-	4	67/6	
Utollalu ...	68	80/-	60	75/-	13	71/6	30	81/-	17	70/-	
Santawerry ...	51	80/6	34	74/6	5	69/-	7	N.	8	68/6	
Santawerry, J. ...	51	N.	22	N.	3	66/-	9	N.	12	68/-	

—	No. 1.		No. 2.		No. 3.		PB.		T.		Extra.	
Cannon, M. ...	23	80/-	27	75/6	8	69/-	5	N.	9	68/6		
Cannon, B. ...	5	N.	13	N.	9	69/6	4	N.	6	67/-		
NILGIRIS.												
Glenvans ...	89	N.	136	76/-	24	71/-	13	86/-	37	69/6	72	N.
Goodalur, WPC...	70	N.	71	N.	...	...	...	...	...	...	4	85/-
Helen, WPC. ...	15	N.	16	N.	...	...	...	...	...	...	1	83/-
Suffolk ...	41	N.	...	...	...	...	...	...	...	...	1	85/-
Hope ...	19	N.	18	N.	...	...	...	...	...	...	1	85/-
Barham ...	11	N.	16	N.	...	...	...	...	...	...	1	83/-
Tulloes ...	38	77/-	39	N.	...	...	...	...	...	...	1	86/-
Guynd ...	98	N.	143	N.	...	...	...	...	...	...	3	85/-
Kelly ...	37	N.	51	N.	...	...	...	...	...	...	2	83/-
Lauriston ...	15	N.	24	N.	...	...	...	...	...	...	2	82/-
Sandy Hills ...	14	N.	24	N.	...	...	...	...	...	...	1	82/-
Hope ...	70	N.	65	N.	...	...	...	...	...	...	3	86/-
COORG.												
Covercooly ...	18	79/-	12	74/6	3	68/-	7	79/-	6	68/6		
Santagherry ...	37	76/-	15	71-6	3	65/-	7	N.	6	67/6		
Covercooly. ...	29	76/-	14	72/-	3	66/-	13	N.	10	67/-		
	52	78/-	32	74/-	7	68/-	15	82/6	15	68/6		
Hallery ...	35	77/-	28	73/-	11	69/-	9	N.	16	69/6		
Aynsley ...	33	N.	21	73/6	2	65/6	10	N.	16	69/6		
Covercooly ...	206	78/-	136	74/-	5	68/6	74	N.	142	70/-		
Dubarry ...	38	N.	35	N.	...	...	10	N.	...	...		
Eldorado ...	20	73/-	16	69/-	...	...	8	N.	...	...		
Santicoopa ...	59	74/-	49	70/-	2	65/6	16	N.	...	...		
Faith ...	34	75/6	11	70/-	1	65/-	8	N.	...	...		
Allicutty ...	8	78/-	12	74/-	6	68/-	5	76/-	5	68/-		
Kibber Betta ...	36	79/-	31	74/6	2	68/6	10	79/-	8	68/6		
Netley ...	33	N.	20	N.	1	64/-	14	N.	...	...		
Balakadoo ...	19	N.	16	N.	1	N.	6	N.	...	...		
	28	N.	13	71/-	2	64/-	8	N.	9	68/6		
Bajee Collie ...	19	N.	15	N.	...	...	3	N.	4	67/6		
Netley ...	103	76/-	40	N.	...	...	37	N.	...	...		
Balakadoo ...	71	76/6	25	N.	...	...	15	N.	...	...		
Corringabetta ...	12	N.	11	66/-	1	N.	4	N.	...	...		
	20	80/-	120	75/-	...	...	45	79/-	...	...		
Beachlands ...	13	N.	20	N.	...	...	3	N.	7	67/-		
	37	77/6	36	74/-	3	68/-	8	N.	10	69/-		
Hunchi Betta ...	19	N.	15	72/-	2	65/-	2	N.	10	69/-		
Craig's Eliza ...	24	N.	26	73/-	1	N.	7	N.	...	...		

With the exception of Tea, which is kept up by the strong demand for consumption, practically all Mincing Lane articles are suffering from the difficulty of obtaining permits for export, and the depletion of staffs, in some cases the removal of principals, by the calling up of the married groups. During the week ending 29th May supplies were moderate and prices well maintained, but last week the offerings were rather heavier and the market generally was inclined to be dull. East India second sizes have

been well competed for at full prices. Bold sizes move slowly, but holders are firm and buyers have to pay the prices asked. For the week ending 6th June the market has been quiet, the small offerings meeting with a rather slow demand at about unchanged prices. In East Indians second sizes again did best.

Tea.

The Colombo Tea Sale on 21st June was a large one, 2½ million lbs. being offered, but the market was dull and prices had a downward tendency.

At the Calcutta sales on 13th June 19,000 packages were dealt with. Messrs. Carritt Moran and Company report that the current range of prices for medium and common grades compares unfavourably with rates at present ruling in Mincing Lane. The scarcity of tonnage which is already being felt by shippers who are unable to secure enough for their immediate requirements is responsible to some extent for the existing disparity between the two markets. That this position is likely to continue, for the present, at all events, seems probable for limited shipments now going forward will automatically regulate the London sales while the local market may be freely supplied.

CALCUTTA PRICES 13TH JUNE.

	1916.		1915.		1914	
	A.	P.	A.	P.	A.	P.
Lowest leaf ...	7	9	9	3	6	8
Even leaf pekoe souchong...	8	3	9	9	7	0
Lowest broken ...	8	0	9	3	6	9
Common broken ...	9	0	10	0	7	6
Low pekoes ...	8	9	10	3	7	6

The quantity of Tea exported to the United Kingdom is as follows: –

	1916.	1915.
From Calcutta—		
1st to 15th June ...	3,682,956	5,205,340
1st April to 15th June ...	11,306,507	—
From Chittagong—		
1st to 15th June ...	Nil.	—
1st April to 15th June ...	6,788,330	—
Total—		
1st April to 15th June ...	18,094,837	12,364,612

In the London market Tea has continued to meet with a strong demand and prices generally have been well maintained with the exception of some broken leaf grades which have occasionally been a little in buyers favour. A good demand continues at full prices except for inferior lots.

Rubber.

Rubber has been very dull with little demand from either the home trade or America. Manufacturers in the States must now be kept fairly well supplied with deliveries being made under heavy forward contracts. Prices on 6th June were about 2/7½ for crepe and 2/6½ for smoked sheet.

Spices.

Pepper.—There has had rather more enquiry and prices are firmer. Fair Tellicherry about 9d on the spot.

Cardamoms.—Heavy arrivals and the practical stoppage of export keep the market very quiet. In auction last week a few fine Mangalore sold well up to 5/9.

R. D. A.

CORRESPONDENCE.

17th June, 1916.

The Labour Question.

THE EDITOR,

Planters' Chronicle.

Sir,—There is little doubt but what Mr. Storey's letter goes to the root of the Labour Problem in Ceylon, and his letter is rather a relief after the report of the Commission on the Sabaragamuwa case. I hope that Mr. Martin will take "the tip" from Mr. Storey and let us hear openly what our troubles are, as his last report was of the usual style given by Directors, who explain "parables by metaphors."

I must say I agree with "Sambellum" in all he had written. We are not treating our Kanganies and coolies as we ought. This is largely due to our Directors who do not realise that a Planter can often make more profit for his Company at a higher cost per lb., than his neighbour, paradoxical as it may seem.

The burning question is how is the Labour Problem to be solved and is it being solved by the present methods of the Labour Department. I think not, not that I wish to be a hard critic of the Department which has had its own troubles. Our Director has given orders for the reduction of advances and is advancing to meet the enemy, and never Captain went into battle with a more mutinous troop behind him,

Now Sir, some diseases require a radical cure and this is certainly one of them and although my cure may not be a new one it is the only one. Do away with the advances altogether and pay each cooly Rs. 3 on Estate account who promises to come and work on our Estate for nine months. This new scheme raises several important questions which I propose to answer, and no matter how unsympathetic a reception it may receive from Mr. Martin, the fact remains that it is an honest attempt by a practical planter who has criticised the Department to bring forward a scheme which will settle our differences and bring those without into the fold, which our Director's half measures will never do, as long as Planters and Kanganies are what they are.

1st. How it is going to effect our cost per lb.?

2nd. How it is going to effect the Managers of Estates, good or bad, healthy or unhealthy?

3rd. Are the Estates outside the Department going to join us and how is Ceylon going to effect us?

4th. How is it going to effect the Kanganies and coolies?

5th. How is it going to effect our Director?

1st. Let us take an Estate of 500 acres having a cooly per acre and giving a yield of 500 lbs. per acre @ 25 cents per lb. F. O. B. The first thing to happen will be that it will raise our cost per lb. 0·60, and there will be "stinkers" from our Home Friends *re* the extra expenditure and questions asked as to what the Labour Department is doing. This can be settled by our impressing upon them the compound interest they have paid on outstanding advances for the past ten years and the amount of advances written off as bad.

To the Directors I would say this scheme will test whether your Manager is fit for his work or not.

2nd. Granted we have no more advances what is going to happen to our present outstandings? Those that are at present good will soon be worked off and those that are bad must be written off as circumstances permit. Our Kunganies are then going to be out of debt, and some say that they will then be unable to work them. To these I would advise taking long leave to Ceylon.

Another Manager would say but this is a rotten Estate and how am I going to get coolies without advance. To him I would say treat your coolies fairly, see that they get the best rice, see that their medical wants are attended to, work them hard but above all give them your personal attention and you will always have labour.

Yet another may say, I am not allowed any little extras to give to the coolies in the way of presents by which some planters keep their advances down and their coolies happy and contented. To him I would say you will be much better off under the new scheme, because planters will be less able to "ike" their accounts, and you will not have the wonderful low advances of some men thrown at your head, which do not exist, but have been made up by their Clerk "who likes to please Master."

3rd. There are some planters who are at present outside the pale because they pride themselves that they are able to get labour without any help. These are mostly men who have spent their life on one Estate and who are in many cases very fond of the bawbees and for that reason alone they would join us.

The Chief Objector to the Department says that our present scheme cannot be run for the money, and I agree with him that we require 20 Europeans on Rs. 600 per month instead of the poorly paid ones we have at present if our Director's scheme is to be carried out. He too I believe would join the new scheme.

What about Ceylon. Would they take advantage of our new scheme. I am certain they would not as they have always played the game in fact I believe they would not be long in following our good example.

4th. Granted the new scheme was in operation it is going to be indeed hard for the first year on our good friend Ramasamy. He is going to be very short of funds because nobody is going to lend him money with no prospect of his getting a big advance next year on the strength of coolies he sent up this year on borrowed money. He is no longer going to take an advance of Rs. 12 per head for 100 coolies and send up 60 coolies at Rs. 30. We would need to be a little kind to him at first and give him his pay as it becomes due, to send to his relations.

One may ask how is he going to keep his gang together. I would repeat to him the advice I gave to the Manager of the rotten Estate.

Our Kangany is going to become a man and we will have to treat him as such. We are going to be able to keep him fairly honest and as a result the best Kangany will have the best coolies wherever he is, and our coolies, after the first year, are going to be happy and contented.

Now Sir, to summarise my scheme what do we find.

1st.—Our labour is going to cost a fixed % per lb. and not an unknown quantity in bad advances.

2nd. The best Manager is going to have the best Labour wherever he is.

3rd. We are going to be a United Planters' Association.

4th. Our Kanganies are going to know the value of money and are no longer going to be loaded with contracts that don't pay. Our coolies are going to be free and happy and are no longer going to be bluffed into answering to false advance accounts, but are at the end of their agreements going down to their country with the result of their labour in their hands.

5th. We are going to do without legislation, the curse of Ceylon both for the planter, and the cooly. Few Labour Rules will be required after the Kangany has taken a printed receipt from the cooly who has received the "Planters Shilling." Disputes between Estates will decrease, and the few blacklegs that there will be, can be dealt with by the Local Associations.

I am sorry to have kept Mr. Martin so long in suspense as to his fate which however is going to be a pleasant though stormy one. As a Rs. 2.000 Director may not be required under the proposed scheme, I would advise his being paid a pension of Rs. 1,000 per month for his services to the Planting Community of South India. So that his retirement might not hang heavily on him we might ask Mr. Lloyd George to give him the Premiership of the new Irish Parliament, a position for which he is most eminently fitted. On our well earned leave, after five years of Ramasamy, I am sure he would give us a pass for the Distinguished Service Gallery and perhaps those who have not criticised him may even be stood tea on the Terrace by the Banks of the Liffey.

I enclose my card and remain

Yours faithfully,

"UT VENIANT OMNES."

Spraying for Leaf Disease

Dear Sir,—I have just read Dr. Coleman's most interesting paper on Spraying that appeared in the *Chronicle* dated June 17th. I note in it he particularly makes a point that Spraying will most likely kill the Green Bug parasite. This apparently does not appear to be the experience of Mr. Frattini, who in his circular No. 20 wrote as follows:—

"As an experiment Sprayed a few trees in May which were infected with Green Bug to ascertain whether it would be effectual in killing the scale, but more so to see whether it would prevent the appearance of the Parasitic Fungus on those particular trees in the monsoon."

"The effect of the Bordeaux Mixture on the scale had practically speaking very little effect, but towards the end of June a considerable quantity of fungus had put in an appearance despite the presence of a good deal of the Bordeaux Mixture still remaining on the leaves. This is rather an important point, because should the practice of spraying estates annually with Bordeaux Mixture to prevent Black Rot, become practicable, (which I sincerely hope it will) and at the same time those particular estates are also infected with Green Bug, we now know that the Bordeaux Mixture will not prevent the Parasitic Fungus from doing its work on Green Bug."

As this is a point of the greatest interest to planters whose trees are suffering from both Green Bug and Leaf Disease, may I ask these two gentlemen for further information.

Yours faithfully,

H. KERR.

Santaveri, June 20th

The following correspondence between Dr. Coleman and Mr. Hunt has been placed at our disposal.—(ED.)

Spraying of Coffee.

June 23rd, 1916.

Dear Coleman,—I read your lecture given at Coffee Planters' Conference, on spraying, with much interest. I visited Hooldi Estate 2 or 3 times, just after I saw you in Saklaspur and I think from what I saw that, at least, a palliative for blackrot and leaf disease has been found. But before starting any spraying here I would like, with your permission, to ask a few questions. Green Bug has appeared here and from reading your article in *P. C.* I gather it is not advisable to spray for Black Rot where bug exists—now I would like to ask.

(1) Is it impossible (or inadvisable for any chemical reason) to mix the Bordeaux mixture and the fish soda together, so that one spraying may do dual duties. Such spraying to be done after the monsoon so as not to kill bug fungus.

(2) Would such spraying be likely to kill off or decrease the bug fungus the following wet season.

(3) Do you anticipate that several years consecutive sprayings would eventually have any injurious effect either on the coffee bushes or crop. (I ask this question as I was told at Hooldi that after 3 sprayings the berries on the trees turned yellow.)

(4) Is the fertility of the soil likely to suffer in any way from becoming impregnated with sulp. copper; will not the Sulp. copper kill germs in the soil.

* * * * *

Yours sincerely,

(Signed) THOS. HUNT.

Office of the Director of Agriculture in Mysore,

Bangalore, dated June 27th, 1916.

My dear Hunt,—Your letter of the 23rd instant, has just been received. I am taking your suggestion and will send the first part of your letter (re spraying) to the *Planters' Chronicle* with my reply. The replies to the various questions are as follows:—

1. We have tried mixing the two spray materials (Bordeaux mixture and Fish oil resin soap) but have not up to the present been successful. I have arranged for experiments in the Chemical Laboratory of the Department to ascertain whether an efficient combination of fungicide and insecticide can be made and have hopes that we shall succeed. It must not be forgotten however that spraying after the monsoon is not likely to have any appreciable effect on the black rot fungus.

2. I do not think such spraying would have any appreciable effect in preventing the growth of the Green Bug fungi during the following rainy season.

3. There is in my opinion no danger from sprayings done over several consecutive years. It is possible that injurious effects might occur if too frequent sprayings were done in any one year, but I doubt if it will be found practicable to spray coffee with Bordeaux mixture more than once or twice a year. Spraying with Bordeaux mixture has been continued in orchards and vineyards in both Europe and America for very many years without producing injurious effects upon the plants.

4. No injury to the fertility of the soil need be feared from the small amount of copper contained in the Bordeaux mixture as applied to coffee. Spraying for vineyards, orchards and even such crops as potatoes has been regularly practised year after year for the past thirty or forty years in Europe and America without producing as far as I am aware any injurious effects upon the soil. With the heavy rainfall of the coffee districts there will be much less danger of an accumulation of copper in the soil than is the case in Europe or America.

* * * * *

Yours sincerely,

(Signed) LESLIE C. COLEMAN.

Saklaspur, June 27th, 1916.

THE EDITOR,

Planters' Chronicle.

Dear Sir,—The results I have obtained from *early* and clean soil cultivation during the past *2* years so thoroughly bears out what Mr. Danvers has to say in your last issue on the subject of smothering the mulch by clean digging and renovation to check Leaf Disease that, for the benefit of those concerned, I should be glad if you would publish my experience of this method.

For many years past I have been in the habit of commencing soil cultivation about the middle of August, that is to say about the time when black rot was at its worst and leaf disease just commencing.

About 2 years ago after hearing what Dr. Coleman said as to the probability of coffee being infected with black rot from the mulch on the ground I decided to try the effect of burying the mulch *before Black Rot and Leaf Disease showed up.*

I chose 2 fields, aggregating 30 acres, that had suffered very badly from these diseases in previous years and commenced clean digging with mamoties and renovation in alternate lines on July 14th, 1914 completely burying all the mulch and weeds. The result of this was a marked decrease in both Black Rot and Leaf Disease although the fields were not free from either.

In 1915 I commenced the same work (*i.e.*, renovating the line dug the previous year and digging the renovated line) in the same fields on *July 4th* finishing both these fields before the end of July. The result was that both of the above named Pests were conspicuous by their absence throughout the year, whereas the remainder of the estate suffered badly from Leaf Disease and in a lesser degree from Black Rot.

The crop picked off these 2 fields in 1915-16 (a notoriously bad season) was a good one being far better than any other part of of the Estate. Further the crop now on the trees in these fields as the result of last year's work promises to be much better than last season's in spite of 2 hailstorms before the monsoon!

One would naturally suppose that monsoon work done during the heavy rains in July would lead to a lot of wash and would puddle the soil badly but the renovation pits prevent most of the wash and as for puddling the soil the results obtained so far have been so good that I wish I could puddle the whole estate in the same way!

Of course, it is impossible to do the whole of one's estate in this way before the commencement of the August attack of Leaf Disease as one's labour does not usually come in much before the midde of June but it is worth a trial on those fields which suffer yearly from bad Leaf Disease and most of us have one or two such fields, if not more.

I should mention that the fields referred to above were handled out previous to the soil cultivation and all the wood removed was buried with the mulch.

Yours faithfully,

C. LAKE.

Election of Planting Member.

25th June, 1916.

THE SECRETARY,
U. P. A. S. I.,
Bangalore.

Dear Sir,—I enclose herewith copy of letter which I have sent to Mr. Barber and Secretaries of local Associations with reference to the unfortunate misunderstanding that I was seeking election for the Madras Council in opposition to him. The only nomination before the Planters of Southern India was our present member which was unanimously carried at the last U. P. A. meeting and the only explanation I can give for the misunderstanding is that Associations seem to have forgotten what took place at our meeting in Bangalore last year.

In future elections some definite rule must be laid down whereby the candidate or candidates must be nominated at the U. P. A. meeting immediately preceding the election of the Council Member and the names of the candidate or candidates standing sent in officially to the Secretary of all local Associations.

While thanking those who did me the honour of voting for me I feel sure it was done in ignorance of Mr. Barber's nomination which was the only one before the Planters of South India but I trust this letter will clear up any idea that may have got about that I was opposing Mr. Barber for election as I never had any intentions of standing against him which I think would show a very poor return for all he has done for us.

I shall be much obliged if you will publish this in the next *Chronicle*.

Yours faithfully,

J. A. RICHARDSON.

Double Export Duty in Travancore.

Mr. Richardson has sent the following letter and enclosure from Sir J. D. Rees, M. P. to Messrs. Rowe White & Co., for publication.

Alwards,
Stanmore, 14—5—16.

Gentlemen,—I beg to acknowledge receipt of your letter of the 11th with enclosure which I have handed to Mr. Chamberlain, the Secretary of State for India, explaining to him the position, and informing him of the magnitude of the interests at stake.

I am also writing to Sir Wm. Meyer on the subject.

As I said at the meeting Mr. Chamberlain wrote out for a full report when I first raised the subject.

Will you kindly peruse and return enclosed, on which I am still engaged.

Yours faithfully,
(Signed) J. D. REES.

15/5/16.

P.S.—Mr. Chamberlain's Private Secretary writes under date of this day.

"Mr. Chamberlain will have the letters of the Travancore Tea Companies formally addressed to himself dealt with officially without undue delay."

Tea (Export) Tax.

Sir J. D. Rees asked the Secretary of State for India whether the export tax on tea which amounts to a bounty to foreign tea-producing countries, is a strictly temporary war tax?

THE SECRETARY OF STATE FOR INDIA.—(Mr. Chamberlain):—I am afraid I cannot forecast future Budget arrangements.

Sir. J. D. Rees asked whether India will be represented at the Paris Conference; whether the question of imposing an import tax in the United Kingdom on tea from other countries of the same amount as the tax recently imposed upon tea exported from India, has been, or will be, considered by His Majesty's Government; and whether the new Indian export tax will be held to be applicable to the unshipped balance of last season's Indian tea crop.

Mr. CHAMBERLAIN: The answer to the first question is in the negative and to the third question in the affirmative. I have not thought it necessary to make any representation to the Chancellor of the Exchequer on the lines suggested in the second question.

Note:—I am going on with this and will take up with C/ of Exr.

(Presumably Chancellor of the Exchequer).

The Planters' Chronicle.

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(Secretary's Registered Telegraphic Address "Planting," Bangalore.)

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THE U. P. A. S. I.

(INCORPORATED.)

Contents.

We publish the proceedings of the General Meeting of the Nilgiri Planters' Association and those of the Coorg Planters' Association. It will be noted that the former elected Mr. Barber as Planting Member of Council and that Mr. Nicolls and Mr. A. S. Dandison were elected delegates to the Annual General Meeting of the U. P. A. S. I. At the latter Messrs. Tipping and Jackson have been elected in the same capacity and that the Hon'ble Mr. Barber was re-elected.

R. D. A. has furnished his weekly article on Markets, Prices and Statistics.

A good deal of space is taken up in correspondence. On spraying for Leaf Disease, which gives expression to the personal experiences from Planters of long standing, from different districts rainfalls and climates. We trust that the interest roused in the subject will not be allowed to lapse. To Messrs. Martin, Leslie-Rogers and 'J' our thanks are due.

We would remind the Honorary Secretaries of District Associations that the election returns for the Planting Member of Council should reach these offices on the 10th instant, and also that original resolutions to be proposed at the next Annual General Meeting should reach us for circulation before the 14th instant.

We hear on good authority that Sir Thomas Holland, Chairman of the Commission of Industries and Commerce, will be in Bangalore on the 9th August—remaining until the 15th.

SOUTH INDIA PLANTERS' WAR FUND.

	Rs.	A.	P.
Amount previously acknowledged	45,469	12	8
Mr. Stephen Bayly	10	0	0
Mr. V. L. Travers Drapes	10	0	0
Mr. R. Lescher	25	0	0
Mr. R. Ainsworth	25	0	0
Total...	45,539	12	8

OVERSEAS AIR CRAFT FUND.

Balance	95	0	0

DISTRICT PLANTERS' ASSOCIATIONS.

Nilgiri Planters' Association.

At a general meeting of the Nilgiri Planters' Association held at the Collector's office on Monday, the 19th June, 1916, the following were :—

PRESENT.—Mr. J. S. Nicolls in the Chair, Mr. Gerrard Rogers, (Honorary Secretary), Messrs. J. Harding Pascoe, W. A. Cherry, B. A. Marden, J. Bissett, S. Bayly, W. C. Deane, A. K. W. Downing, J. B. Leslie Rogers, Piggott, G. A. Rutter, George Oakes, J. A. Cosens, J. B. Vernede, N. J. Stanes, L. King Church, *Visitor*—Mr. E. H. Jones, D. S. P.

THE LATE EARL KITCHENER.—Before the business on the agenda was taken up, the Chairman remarked: "Since our last meeting we have been called to mourn the loss of a great military personality in the sad and calamitous death of Lord Kitchener and I would ask this association to place on record that it mourns with the Empire in the great loss it has suffered."

The motion was carried unanimously, all members present standing.

PROCEEDINGS OF LAST MEETING.—The proceedings of the previous meeting were taken as read.

ELECTION OF PLANTING MEMBER.—Before proceeding with the ballot for the election of a Planting Member to represent the Association on the Madras Legislative Council, a letter from the Hon'ble Mr. Barber was read, after which the ballot papers were passed round, with the result that Mr. E. F. Barber was unanimously elected by the association.

U. P. A. S. I. CIRCULARS.—Of the several circulars from the United Planters' Association, it was resolved to publish the following :—

TEA ESTATES EMPLOYING MACHINERY.—The following letter from the Secretary U. P. A. S. I. was read and recorded.

"On the 9th May I submitted for the consideration of the Government of Madras the resolution passed by the Nilgiri Planters' Association, relating to the income tax levied by the Collector of the Nilgiris on owners of Tea Estates employing modern machinery in that District and the following is the Government Order I received to-day which I beg to circulate for your information."

"With reference to his letter of the 9th May 1916 the Secretary to the United Planters' Association of Southern India will be informed that instructions are being issued for the exemption from assessment of the profits of tea factories."

RAILWAY RATES FOR TEA SEED.—The following letter from the Secretary U. P. A. S. I. was read and recorded with satisfaction :—

"I have received the following letter from the Deputy Traffic Manager (Freight). South Indian Railway, which I circulate for your information :—

"I have the pleasure to inform you that with effect from 1st June 1916, Tea seeds booked by passenger train will be charged at half parcel rates at or in local booking over this line and in through booking with Foreign Railways."

ELECTION OF DELEGATES.—A ballot was taken with the result that Messrs. J, S. Nicolls and A. S. Dandison were elected to represent the Association at the next meeting of the United Planters' Association.

Mr. Nicolls in a few appropriate remarks thanked the meeting for having elected him for the 4th year to represent the Association at Bangalore. In this connection the meeting also resolved that the allowance for each representative of the Association proceeding to Bangalore should be raised from Rs. 100 to Rs. 150 as the former sum was considered inadequate.

U. P. A. S. I. AGENDA.—The following U. P. A. S. I. Agenda was considered:—

1. Secretary's Annual Report and Statement of Accounts.
2. Chairman's Address.
3. Report of Labour Director.
4. Report of Deputy Director of Agriculture, Planting Districts.
5. Work of Planting Member.
6. Roads and Communications.
7. Agricultural Matters.
   (*a*) Pests and diseases and Pest Act.
   (*b*) Fertilisers (*c*) Products.
8. Rubber. (*a*) Cultivation and Manuring.
   (*b*) Rubber Growers' Association.
9. Legislation. Tax on tea made by machinery.
10. Coffee.—Spraying.
11. Planters' Benevolent Fund.
12. Planters' Chronicle.
13. Tea. (*a*) Duties. (*b*) Shipping Freights.
   (*c*) Indian Tea Cess, I. T. A.
14. Finance.
15. Scientific Department. (*a*) Proposed Re-organisation. (*b*) Scientific Officer's Programme 1916-1917.
16. Rules of the U. P. A. S. I.
17. Election of Office Bearers.

SOUTH INDIAN PLANTERS' BENEVOLENT FUND.—The Chairman drew the attention of members to the circumstance that only Rs. 10 had been paid towards this fund during the year and commended the fund to the generosity of members. It was thought that members had forgotten the existence of the fund and the Honorary Secretary undertook to circularise them.

THE NILGIRI RAILWAY AND FIRES ON ESTATES.—The Honorary Secretary made the following remarks:—

This subject affects very few of the members but those few it affects very badly.

I would therefore ask everyone to give their support in the matter.

Some of the estates through which the Nilgiri Railway runs, suffer considerable losses both of a monetary and a material nature, through sparks from the engine causing fires in the dry weather, which, if not actually started on the estates, have eventually burnt their way to the boundaries and in some cases beyond them.

Expense is incurred by the fact that it is necessary to post coolies along the boundaries to watch for any outbreak of these fires.

I would suggest that the S. I. Railway be asked to fix spark arresters to their engines, or to take any steps to eliminate the danger of the outbreak of fires from the sparks, which they may deem practical.

Perhaps the U. P. A. S. I. could be asked to represent the matter to the Railway Co.

The following resolution, proposed by Mr. Gerrard Rogers and seconded by Mr. Deane, was carried unanimously.

"The Honorary Secretary be asked to approach the Traffic Manager S. I. Railway, pointing out the loss that occurs to estates by fires originating from engine sparks, and that reasonable precaution may be taken to prevent such fires spreading and damaging properties."

WASTE LAND RULES.—Mr. Deane brought this subject up and the following resolution, seconded by Mr. Cherry, was passed:—"That the sale of waste land adjacent to existing estates under the Waste Land and Supplementary rules on the Nilgiris be brought up at the U. P. Association.

EXPERIMENTAL PLOT.—Messrs. Dandison and Rogers will visit this plot shortly.

CONFERENCE OF COFFEE PLANTERS.—It was resolved to publish the following remarks by the Honorary Secretary.

"On the 20th of last month I issued a circular to members having acreages under coffee in the District, notifying them that a meeting of Coffee Planters' would be held on the 5th instant at the offices of the U. P. A. S. I.

Mr. Dandison, Mr. Norman Stanes and myself attended the meeting, at which a number of Planters from other Coffee Districts were present.

An account of the meeting was published in the *Planters' Chronicle* of the 10th instant.

The first subject on the Agenda paper was :—

"The spraying of coffee as a preventive against the attacks of Fungoid Diseases."

We are fortunate on the Nilgiris in so far that, at present, the damage done by Leaf Disease and Black Rot is not so serious as it is in some other Districts.

The results obtained from spraying have so far been satisfactory and warrant further experiments on a larger scale, was the conclusion arrived at by the conference. Perhaps now that the end to some extent justifies the means, some practical planters will carry out experiments on their own estates, as hitherto, so far as I could gather, this has been carried on solely by the Scientific Department.

While on this subject I would like to mention that Dr. Coleman gave us a most interesting address on the subject of spraying, in which he referred to some experiments his Department have been carrying on with spraying a fungoid disease which attacks the Areca Nut, experiments which have achieved very satisfactory results.

"Nevertheless I think it must appear to the onlooker that we only study effect and endeavour to remedy that, without considering the cause of such diseases."

The second subject discussed was manuring of coffee.

Some interesting particulars were given of results obtained on various manurial experimental plots. The most interesting were those shown on a blackboard and I think we might ask the U. P. A. S. I., to have them published in the *Chronicle*, as they show what can be done by analysing soil and systematic manuring.

The last subject referred to seed coffee.

The conclusion arrived at was that systematic methods of selection were necessary.

The method proposed by Mr. Anstead was roughly as follows:—"To collect seed from trees which are known good croppers and free from any disease, and raise nurseries from the seed so obtained. Again from these nurseries to select only the very best plants and with these to plant up a patch for growing seed bearers.

The coffee planting industry is by no means a small one as shown by the acreage under this product in S. India, namely, 194,735 acres, and it behoves those of us who are interested in coffee to work together in these matters for our mutual benefit. It is hoped to hold these conferences annually and I hope the next one may see a still larger attendance.

(Signed) J. S. NICOLLS,

Chairman.

(„) L. A. GERRARD ROGERS,

Honorary Secretary.

Coorg Planters' Association.

Annual General Meeting held in the Bamboo Club, 1st June, 1916.

PRESENT.—Messrs. A. H. Jackson, F. Macrae, C. G. Maclean, G. R. Pearse, N. M. Scholfield, H. T. Shaw, W. A. F. Bracken, W. M. Ball (President), P. G. Tipping (Honorary Secretary.)

Before commencing the business of the Meeting a vote of condolence and sympathy was moved from the Chair to Mrs. Graham on the untimely death of her husband, and to the relatives of Mr. H. G. Grant and Lieut. H. L. Robinson and was unanimously adopted.

Result of Ballot for Committee, President, Honorary Secretary and Delegates :—

President	...	W. M. Ball.
Honorary Secretary	...	P. G. Tipping (Declined the honor on the score of ill health.)
Delegates	...	P. G. Tipping and A. H. Jackson.
Committee	...	North Coorg—C. G. Maclean, G. R. Pearse, G. K. Martin, J. W. Irwin, H. M. Mann and H. C. Wood.
		South Coorg—A. H. Jackson, W. A. F. Bracken, F. W. Gerrard, James Hume, F. Macrae and P. G. Tipping.

Minutes of last General Meeting read and confirmed.

HONORARY SECRETARY'S REPORT.—Mr. Chairman and Gentlemen,—During the past season this hideous war has occupied a very prominent place in our minds and lives, for, apart from the general knowledge and anxiety of all this terrible war means to each and all of us, there are few of us who are not personally anxious for the safety of relatives, who are giving all that a man has to offer in the service of the Empire.

It is with deep regret that I have to record the death of our late President Captain J. A. Graham, killed in the trenches in France, of Mr. H. G. Grant, the severe wounding of Lieut. C. E. M. Browne son of the Chairman of the U. P. A S. I. and a member of this Association, and the death of Lieut. H. L. Robinson, killed in Mesopotamia, who, though he was not actually a member of this Association, has many near relatives in the Province and the wounding of Mr. C. Legard, who has happily recovered.

MEMBERSHIP.—We had during the past season 56 subscribing members and 11 honorary members, 6 of whom are with the army and the other 5 are officials of the Province and Dr. Leslie C. Coleman.

Of subscriptions of the past season only 4 are outstanding.

SCIENTIFIC OFFICER AND EMERGENCY FUND.—The subscription to this was, as you know, fixed at 4 annas per acre, in April 1914. Two annas of which goes to the U. P. A. S. I., and two annas to our emergency fund, all subscriptions to this fund, with the exception of two have been paid, there being, now, an ample reserve, it was decided, at the general meeting held in March, that for the immediate future no further calls should be made on this account, the annual subscription to the U. P. A. S. I., being met from the reserve. I might also mention that our Commissioner has intimated that the Coorg Government is willing to pay a proportion of the sum held in abeyance, against the appointment of an assistant Scientific Officer for Coorg, towards the scheme by which the Government of Madras takes over the U. P. A. S. I. Scientific Department, which scheme has been delayed by the war but is now taking form.

ROAD AND COMMUNICATIONS.—You will be glad to know that no very material reduction has been made in the Government grant for the upkeep of roads. The Sidapur-Frazerpet road has now been Imperialised, and an iron girder bridge constructed across the Chickli hole on this road. A large portion of the Grant has been spent on construction and repairs of bridges, calverts and causeways. Large quantities of road metal have been accumulated for application whenever a sufficiency of labour and water are available.

RAILWAY.—Nothing further has transpired officially with regard to this project, but private information holds out strong hopes of the Railway coming, at least, as far as Frazerpet within the next 2 years. Recently a Motor Mail service has been established, which though it does not make much difference with regard to delivery and posting times, generally, is a great convenience as it carries passengers.

CORRESPONDENCE relating to inconvenience of mail hours in North Coorg, Enhancement of bail in breach of contract cases, sites for the establishment of Experimental Stations, Pest Act, &c., &c., together with a copy of the Accounts are laid on the table.

I have to ask you to pass the accounts and in tendering my resignation, at the end of another year of office, would again place on record, my appreciation and thanks to the President and other members of your Committee, for their assistance and co-operation in the work of this Association.

ACCOUNTS.—These were read and passed.

Mr. H. Cuthell was then proposed for membership by Mr. Ball seconded by Mr. Tipping and was duly elected.

ROADS AND COMMUNICATIONS.—Correspondence relating to the resolution about roads adopted by the last General Meeting came under discussion, and in the absence of an Honorary Secretary, the President kindly undertook to write to the Commissioner regarding the same.

PESTS.—That this Association is grateful to and in sympathy with our Commissioner in his "borer" investigations, and members intimated their willingness to assist with specimens and notes.

CORRESPONDENCE.—Letter from the District Magistrate of Coorg re bail in breach of contract cases was read and recorded with thanks, Proposed by Mr. Ball and seconded by Mr. Jackson that a copy of this letter be circulated to all members.—Carried.

Letter from the Superintendent of Post Offices recorded with satisfaction.

Proposed by Mr. Shaw and seconded by Mr. Macrae that the misconnection of Pollibetta-Mercara mails be brought to the notice of the Postal authorities.—Carried.

U. P. A. S. I.—The 14th of August was approved as a suitable date for the Annual Conference. Mr. Jackson and Mr. Tipping being elected delegates. The Agenda discussion being left to the Committee.

Scientific Experimental Station correspondence was read and discussed. The intimation that the Government of Coorg would further support the Madras Government on the proposed Scientific Scheme, recorded with satisfaction.

Sir Hugh Daly's letter was recorded with thanks.

The Ballot for the Planting Member on the Legislative Council of Fort St. George was held in prescribed form and the Hon'ble Mr. E. F. Barber was duly elected, by this Association.

A hearty vote of thanks was accorded the retiring Honorary Secretary and a vote of thanks to the Chair terminated the meeting.

(Signed) W. M. BALL,
President.
(,,) PERCY G. TIPPING,
Acting Hon. Secretary.

MARKETS, PRICES, AND STATISTICS.

Coffee.

Offerings at auction have been:—

—	May 30 to June 2.	Total since 1st Jan.	Last year.
East Indian ...	2,387	24,161	21,233
Costa Rica ...	2,004	74,887	67,407
Other Milds ...	1,169	53,325	91,410
Brazil ...	2,896	47,206	63,834
Robusta ...	Nil.	627	10,995
B. E. A. & Uganda ...	32	7,354	7,518

The following prices have been obtained for South Indian Coffee:—

—	No. 1.		No. 2.		No. 3.		PB.		T.	
MYSORE.										
Nugger ...	62	N.	28	71/6	...	...	...	...	...	...
Hospet ...	40	N.	33	N.	5	68/6	16	N.	16	67/-
Chininhalli ...	28	31/6	31	75/6	3	68/6	4	82/6	6	69/6
Chickilli ...	51	N.	43	N.	9	68/-	7	N.	18	66/-
Mavinkere ...	38	N.	23	N.	4	N.	8	N.	12	N.
Attikhan ...	31	79/-	68	75/-	7	67/-	5	78/-	9	68/6
Gorrayhatti ...	9	N.	7	73/6	1	64/-	2	75/6	6	68/-
Oliver's, K. ...	31	N.	11	73/6	2	65/-	4	N.	2	66/-
The Giri ...	17	82/6	18	75/6	5	71/-	4	80/-	6	70/-
K. TT. ...	8	N.	8	N.	3	66/6	4	N.	3	66/-
H. DD. ...	29	N.	19	N.	3	65/-	9	N.	9	67/-
Cannon B. ...	14	74/-	32	71/-	22	68/6	8	74/-	5	66/-
HC. S. ...	28	N.	17	N.	5	67/-	8	N.	8	69/-
HC. SS. ...	20	N.	17	N.	7	67/-	4	N.	6	68/6
CC. J. ...	8	N.	11	N.	7	67/-	2	N.	2	66/-
CC. S. ...	18	N.	9	N.	2	67/-	3	N.	2	67/6
COORG.										
W. W. F. B. ...	28	N.	22	N.	2	66/6	9	N.	20	67/6
Santikoppa ...	73	77/-	52	72/6	1	68/-	22	N.	39	68/6
Hallery ...	43	N.	50	73/-	5	68/-	13	N.	23	68/6
Santagherry ...	20	N.	16	N.	1	68/-	6	N.	37	68/6
Allicutty ...	26	N.	36	N.	4	67/-	8	N.	24	69/-
Balakadoo ...	23	N.	19	67/-	1	57/-	9	N.	13	64/-
Cota Kadoo ...	60	N.	37	N.	2	66/-	13	N.	37	69/-
Kibberi Betta ...	22	77/-	27	73/-	3	66/-	8	N.	7	68/6
NILGIRIS.										
Glenvans ...	29	N.	48	76/-	10	71/-	8	N.	16	69/-
	Extra 29	N.								

Tea.

The following figures are published by the Indian Tea Association.

		1916.	1915.
Sailings to Great Britain in May—			
From Calcutta, in May	...	2,074,560	3,714.464
From Chittagong, in May	...	784,210	548,392
From 1st April to 31st May	...	13,920,592	4,881,153
Sailings to Australia and New Zealand—			
In May	...	66,475	5,040
From 1st April to 31st May	...	282,886	45,941
Sailings to North America—			
In May	...	210,185	Nil.
From 1st April to 31st May	...	290,263	20,277
Sailings to other places—			
In May	...	2,861.388	1,708,056
From 1st April to 31st May	...	7,052,519	2,010,880
Sailings from South Indian Ports—			
In May	...	1,637,034	1,594,533
From 1st April to 31st May	...	3,611,326	3,566,965
Total sailings—			
In May	...	7,633,852	7,570,485
From 1st April to 31st May	...	25,157,586	10,525,216

The following are the shipments from South Indian ports during the month of May 1916:—

Cochin—		
To London	...	340,746
To Asiatic ports	...	6.166
Tuticorin—		
To London	...	456,611
To New York	...	206,146
To Colombo	...	51,646
Alleppey—		
To Asiatic ports	...	8,073
Calicut—		
To London	...	519,848
To Colombo	...	3,818
To Bombay	...	43,940
To Karachi	...	40
	Total...	1,637,034

The Export of Tea from Ceylon from 1st January to 19th June 1916 was :—

Black	...	77,213,625
Green	...	1,296,623

the corresponding figures for 1915 being 85,680,027 and 2,593,546 respectively.

The following prices have been obtained for South Indian Tea during the week ending 8th June:—

—	B.O.P.	O. P.	Pek.	P. S.	B. P.	B.P.S.	Fgs.	Dust.
NILGIRIS.								
Woodbriar ...	1/-¾	...	1/-¼	11½	1/1	...	...	...
Woodlands ...	1/-¾	...	1/-¼	11½	1/1	...	...	...
Prospect ...	1/1¾	1/2	1/1	...	1/1½	...	...	...
Daverashola ...	1/2¼	1/2½	...	...	...	...	...	...
TRAVANCORE.								
Cherakara ...	1/-¼	1/-½	1/-	11¾	11/½	...	...	...
Thengakai ...	1/-¼	...	1/-	11½	11/¾	...	...	...
Fairfield ...	1/-½	...	11¾	...	...	...	...	...
Nillimunda ...	1/-	...	...	...	11¾	11/½	...	...
Stagbrook ...	1/-¾	...	1/-	...	1/-¼	11/¾	...	...
Mount ...	...	...	11¾	11½	1/-¼	...	...	...
Mayfield ...	1/-¾	1/1¼	1/-¼	...	...	...	1/-	11¼
Glenmary ...	1/1½	...	1/-	...	1/-½	...	1/-	11
Touramulla ...	1/-½	...	11¾	...	11¾	...	...	10
Seaforth ...	1/-¾	1/1½	1/-¼	...	1/-½	...	...	...

Rubber.

The following quantities of Rubber, in centals of 100 lbs. were imported into the United Kingdom during May 1916:—

	1916.	1915
From Dutch East Indies ...	11,158	5,759
From French West Africa ...	888	869
From Gold Coast ...	935	1,552
From Other countries in Africa ...	7,313	2,342
From Peru ...	2,012	2,342
From Brazil ...	22,127	40,349
From British India ...	2,801	993
From Straits Settlements ...	34,112	47,656
From Federated Malay States ...	31,857	23,078
From Ceylon ...	12,621	14,916
From Other Countries ...	5,261	2,999
Total...	131,085	142,945

The following quantities were re-exported.

	1916	1915
To Russia	13,117	53,126
To France	10,966	16,413
To United States	82,994	89,615
To Other Countries	18,035	17,105
Total...	125,112	176,259

R. D. A.

CORRESPONDENCE.

Spraying for Leaf Disease

Abial, Mercara,
29th June, 1916.

THE EDITOR,

Planters' Chronicle.

Dear Sir,—I am afraid I cannot agree with Mr. Danvers' conclusions as to the origin of L. D. (as he calls leaf disease "for short") in the *P. C.* (following his example) of 24th instant, or in one of the remedies he advocates, *viz.*, digging and burying weeds, mulch, &c., known as "Clean digging." I am not a scientific man, and my opinions may not therefore be of much value, but (subject to scientific correction) I don't believe mulch harbours the germs of L. D. though it probably does those of B. R. (black rot for short).

L. D. and B. R. though both of the fungus tribe, have (I still write under S. C.) totally different habits and habitats! B. R. comes during the monsoon, and prevails in damp sheltered fields and ravines where the leaf mulch is thickest. In open windy mulchless parts it does not seem to thrive. The sun quickly shrivels it up, and it disappears with the fine weather. In the drier districts it is rarely found. L. D., on the other hand, comes in the fine weather, and generally in the drier, earlier than in the damper districts. It depends on the season when it appears. If August is a fairly dry month L. D. begins to put in an appearance—first in the drier districts and spreads to moister and cooler parts like the strawberry season in Europe from warmer to cooler climes. This shows that whilst B. R. thrives in damp weather and in sheltered and well mulched parts, L. D. likes dry weather and open places. With me it touches, very lightly, those fields which were badly affected by B. R. in the monsoon, and hits the open gravelly ridges, clayey bottoms, and fields facing east and south. Here the leaf mulch seems to decompose and disappear quicker than in damper and sheltered parts, yet the L. D. seems worse which is the reason for my saying that I don't believe L. D. originates in mulch. It seems to me (writing under S. C.) that it is blown up by the wind when it changes to N.E. and E. When we have a good N. E. monsoon L. D. rarely appears in December.

As to clean digging as a remedy. Mr. Danvers is an old planter like I am. Does he not remember the effect of this work in old days? The melancholy spectacle of a field of coffee clean dug with mamooties say at the end of July or in August; mangled roots strewn on the surface to say nothing of leaves, crop and broken branches the result of lifting and bringing down the mamooties while digging; the ground sticky and well puddled by coolies walking over and over it—did this treatment ever stop a "go" of leaf disease? No. On the contrary when it did come, has he forgotten the distressful sight of a field of coffee recently root mangled and helpless, ferociously attacked by this fell disease? I have not!

You will not, I believe (still under S. C.) stop leaf disease by clean digging, on the contrary you encourage it.

You cannot clean dig with a mamooty without cutting and mangling the feeding and other roots of coffee trees which have spread all over the surface and under, and thereby damaging and undermining the vigour and vitality of the trees. You will not be able to do with less manure after

treating the trees in this fashion—in fact you will have to apply more and oftener, and if leaf disease were to attack them, more manure still would be required. So your expenses will increase rather than decrease. No, clean digging is not a remedy and I am inclined to be rather sceptical about Bordeaux Mixture for why ! Here we have a long standing and deadly coffee disease which was partly accountable for the disease of coffee planting in Ceylon, and here we have a long and well known fungicide in Bordeaux Mixture, while there we have old and learned scientific experts, studying and experimenting without success the extermination of this pest. Do you mean to tell me they never tried, or thought to try, Bordeaux Mixture, and have left it to a young and recent scientist to find out such a simple and effective remedy ! !

Yours faithfully,

G. K. MARTIN.

Spraying for Leaf Disease.

Sir,—I have read with much interest the report of the Planters' Conference in Bangalore regarding Leaf Disease and Black Rot in Coffee. The whole question of how to effectively combat these serious diseases is unusually complicated, as it requires a very comprehensive consideration of every phase of coffee production, from the sowing of the seed to the matured cherry; and any discussion that excludes the etiology of plant diseases must necessarily result in partial conclusions. The late Conference it would appear has tackled the subjects from the wrong end, that is, only the effect, and not the fundamental causes, has been dealt with. Now, all diseases in plants are the result of some predisposing cause, the principal being impaired vitality produced by uncongenial conditions and environment. If we look back to the history of the introduction of Coffee into India we will find ample evidence to show that, generally speaking, only three factors were taken into consideration in opening up new estates, namely temperature, rainfall, and elevation, while little or no attention was paid to soil conditions, the lay of the land or aspect, and suitable shade trees. To have a healthy and long-lived coffee plantation, a good average combination of all these six factors, and perhaps some others, is absolutely essential; but it is to be feared all estates cannot lay claim to this standard. It is not at all uncommon to see coffee on unsuitable soil, planted up and down steep hill-sides which cannot possibly be cultivated, facing every cardinal point of the compass, and shaded with every variety of gross-feeding injurious tree, markedly detrimental to a healthy growth of all vegetation beneath them. All this necessarily connotes insufficient and defective cultivation, leading to a steady decline of plant vitality, conducive to disease.

Contrary to prevalent belief, the coffee plant is not naturally a surface feeder, as under favourable conditions its root system will be found from six inches to two feet below ground; but by shallow cultivation originating in steep planting, it has deliberately been forced to adapt itself to surface feeding; and thus its roots have been artificially subjected to the extreme variations of climate, light, heat, wind, and other severe atmospheric conditions, which ordinarily have little or no deleterious effect on deep rooted

plants. This unusual strain in its struggle for existence, added to the annual drain on its vitality by fruit production, results in a more or less anæmic plant liable to leaf and other diseases. Spraying, though undoutbtedly a useful adjunct, can only be considered as a measure that palliates the effects of disease. but in no sense can it be regarded as a remedy that removes the cause. To throw off disease in either plant or animal, the building up of the constitution is necessary by a gradual but steady restoration of that state of vigour, which is above and beyond what is actually essential for mere existence; and it is in this direction that the true cure for Leaf Disease and Black Rot will ultimately be found. The remedy therefore lies in improved cultivation based on modern knowledge. Young coffee, for instance, should be deep hoed at the first year. Under the existing system it becomes root-bound in its original pit after a very few years, and has to depend for its future sustenance on some inches of shallow cultivation near the surface. For the renovation of old coffee, I would suggest first a good application of lime scattered over the ground, followed by a foot deep forking, which turned up the soil, leaving the clods unbroken. This should be done early in the winter, and a month later there should be a light hoeing (with mamooties) about six inches deep, which broke up the clods, and thoroughly pulverised the top soil. These two diggings early in every year are the basis of all further cultivation: after them very light hoeings, as often as possible, are desirable to prevent caking of the surface, and to bury all weeds, fallen leaves etc. In the second year there should be a liberal application of manure, preferably cattle manure, put down during the first light hoeing of the season, when the clods are being broken and pulverised. For the next three years green manuring is all that is necessary. By this time a good humus tilth would be produced, which should be continuously maintained for the future. Where the land is cold and sodden, drainage is called for, and the drains require to be deep and as narrow as they can be made. The shading of coffee is another matter that also requires greater forethought and consideration than it appears to have hitherto received. All gross feeding surface rooted jungle trees should be gradually removed, and deep rooted small leaved trees of the leguminosæ order be planted in their stead. There are many of this order actually to be found in neighbouring forests, and it is incomprehensible that their beneficial effects have not hitherto received due appreciation. There are many jungle trees now allowed to grow up amidst coffee, which not only exhaust the soil, but whose drippings in wet weather obviously induce a diseased condition in coffee. All such should be ruthlessly extirpated, and their early extinction should be the first move in regulating the shading of coffee plantations.

To combat leaf disease the aim of the planter should be to enhance by every available means the vitality of the coffee plant, and the way lies in judicious shading, and the improvement of the mechanical as well as the chemical condition of the soil. In other words the increase of disease indicates the necessity for a more intensive system of cultivation, adapted to the special requirements of each particular estate. The days are gone by for empirical methods, when it was assumed to be sufficient to order the man in charge to use his own discretion and imitate his neighbours. Cause and effect should ever be remembered in dealing with plant disease; and an outside subsidiary aid such as spraying, can only palliate and lessen the effects, especially in sporadic attacks, but it can in no sense be regarded as a final remedy.

The late Confernce of Coffee Planters has undoubtedly done a considerable amount of good in exhaustively discussing the use of spraying, and showing how far such methods are efficacious; but another Conference is desirable to further discuss the more important question of suitable cultivation based on up-to-date principles. The points that call for attention are deep forking; regular burying of all vegetable matter, proper draining of cold soil, contour digging on slopes, the forming of terraces wherever feasible, a systematic regulation of shade trees, and last but not least a more rational system of pruning. The Leeming system, as it is called, has been much and adversely criticised, but a closer study of its principles will show, that if carried out with the addition of a little intelligent pruning, it ensures a health and vigorous plant under natural conditions, which is practically immune from diseases due to impaired vitality.

J. B. LESLIE-ROGERS,

Ootacamund.

Santaveri P. O.,

Birur M. & S. M. Ry.

4—7—16.

THE EDITOR,

Planters' Chronicle,

Bangalore.

Dear Sir,—The letters in the last Chronicle *re* leaf disease and the methods of combating same are most interesting. Mr. Lake's letter brings back to my mind, a case in which a friend of mine, not many years ago, used to regularly dig the estate during July, and the V. A. was always down on him for this, at that time seeming madness. My friend always held that digging during the monsoons appeared to keep off leaf disease (though at that time I do not suppose he really knew by digging he was smothering leaf disease spores) but being constantly sat upon by the V. A. he dropped digging then and has since suffered considerably more. It would seem to me that we did practically better in the old days, when we clean weeded, dug and covered everything, pruned and handled—and we must gradually revert to the old methods to improve our coffee. It is true we always had leaf disease, but I hardly think as bad as now. Of course it is said the trees have grown weaker and cannot stand the attack, but is it not possible that we kept the disease much more in check then by clean weeding and digging. I, for one, intend going back to the old ways again—even as regards pruning and handling—because I hold that by handling the new wood is better developed and stronger and is better fitted to bear good coffee. No handling means more branches of a weaker sort on which naturally the coffee cannot be so good. Besides the branches being stronger, I should think, are better able to fight disease.

I am, dear Sir,

Yours faithfully,

"J."

The Planters' Chronicle.

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THE U. P. A. S. I.

(INCORPORATED.)

Contents.

We have the pleasure to inform members of the various District Associations that the Hon'ble Mr. E. F. Barber has been re-elected Planting Member of the Legislative Council of Fort St. George. No better selection could have been made, ensuring the continuity of planting politics and justifying the complete confidence reposed in him by the Planting Community.

The Deputy Director of Agriculture, Planting Districts, furnishes us with an article embracing the subject of Sulphate of Ammonia as a Fertiliser in Southern India, Leaching of Nitrates and Bird Life on Estates, fortified with extracts from Bulletin, Journal and letter from the Assistant Entomologist, Ceylon.

We publish the proceedings of the Mundakayam, Shevaroy and Bababudin Planters' Associations.

At the Annual Meeting Mr. Eaton will represent the first, Mr. Travers Drapes the second and Messrs. Kirwan and S. H. Dennis the last.

It is with deep regret that we refer to the sad death of Mr. A. B. Boyd, a well known planter of Mysore who will be very much missed as Chairman of the Bababudin Planters' Association and socially by a large circle. Sincere sympathy will be extended to his young widow.

R. D. A. publishes his weekly article on Markets, Prices and Statistics.

Our correspondence columns are taken up with a reply from Mr. Martin, on the Labour Question, to *Ut Veniant Omnes*. We hope that Mr. Newcome's request will be complied with by some leading manure firms. Two interesting letters on spraying for Leaf Disease are published giving personal experiences.

SOUTH INDIA PLANTERS' WAR FUND.

	Rs.	A.	P.
Amount previously acknowledged	45,539	12	8
Total...	45,539	12	8

OVERSEAS AIR CRAFT FUND.

Balance	95	0	0

SCIENTIFIC DEPARTMENT, U. P. A. S. I

Sulphate of Ammonia as a Fertiliser in Southern India.

During the discussion on the subject of manures which took place at the Conference of Coffee Planters held at Bangalore on 5th June the question of the suitability of Sulphate of Ammonia as a fertiliser was raised. Sulphate of Ammonia cannot be recommended for general use in Southern Indian soils because they are as a rule deficient in Lime and continued use of this manure on soils which are not well stocked with Calcium carbonate has been found by experience in other countries to result in infertility.

A recent Bulletin of the *Massachusets Agricultural Experiment Station* (*No. 165 of November 1915*) deals exhaustively with a series of experiments conducted with a view to testing this very point. The conclusion reached was that Sulphate of Ammonia undoubtedly has a decided solvent action on the Calcium in the soil and depletes the soil of this element. In the case of South Indian soils which contain as a general rule so little Lime and to which it is advisable and beneficial to apply Lime at frequent intervals in order to keep them alkaline and thus a suitable medium for the effective activities of the soil bacteria, this depletion caused by Sulphate of Ammonia can be ill afforded.

The Massachusets Experiments show that what takes place in soil fertilised with ammonium sulphate may be as follows: the first reaction to take place is the physical absorption of the ammonia, thus setting free sulphuric acid. If after the soil has absorbed all the ammonia it is capable of holding some ammonium sulphate remains, double decomposition between the salt and the calcium carbonate in the soil takes place. In both cases the first salt to be attacked is probably the calcium carbonate. In the absence of this salt, and only in its absence, the salts of Iron and Aluminium are attacked. It is to these salts of Iron and Aluminium that the infertility of the soils continuously fertilised with Sulphate of Ammonia appears to be due.

Consequently we may consider that Sulphate of Ammonia is not a suitable fertiliser for South Indian soils and that it should only be used when it is known that there is an abundance of Calcium carbonate in the soil and for special purposes.

Leaching of Nitrates from the Soil.

During the discussion the question of Nitrates was also raised and it was suggested that Saltpetre might perhaps replace Sulphate and Muriate of Potash during the War. This is not always feasible. In the first place, while it is true that Saltpetre is an excellent source of Potash, it also contains some 10% of Nitrogen in the form of Nitrate which cannot be ignored. The soil does not retain Nitrates like it absorbs Potash and the consequence is that if the application of Saltpetre is followed by heavy rain the nitrate part of it is leached out into the drains and is lost. It might be possible to always apply it at a time when the rains are only light, but this is not always convenient from a labour point of view, and it is not in all cases desirable that the crop should get a heavy dose of quickly available Nitrogen which will give it a flush of foliage. Saltpetre is a high priced fertiliser so that one cannot afford to apply it in wet weather and allow the nitrates to deliberately be lost for the sake of the Potash and consequently it will not altogether and in all cases replace the ordinary Potash fertiliser.

The extent to which Nitrates do wash out of the soil is illustrated by Messrs. E. J. Russell and A. Appleyard in an article published in the May issue of the *Journal of the Board of Agriculture* the following digest of which is extracted from *Nature*.

"Of the Broadbank dunged plots at Rothamsted one was fallowed and one cropped during the winter of 1915-16. During the summer the fallowed plot accumulated Nitrate until by the middle of September the top 18 inches of soil contained 170 lbs. of nitric nitrogen per acre, equivalent to nearly 10 cwts of nitrate of soda. The losses then began, and were so heavy in November and December that by February the magnificent stock of nitrate had been reduced to 50 lbs. of Nitrogen. This loss is equivalent to 7 cwts of nitrate of soda, no small item at present prices. The Broadbank fallow plot is no doubt an extreme case, but the cropped plot also suffered considerable loss. It never accumulated Nitrate like the fallow plot, the maximum being 90 lbs. of Nitrogen per acre; half of this was lost during the winter, or as much Nitrogen as is contained in 24 bushels of wheat and the corresponding amount of straw. The losses are naturally greatest on these heavily manured soils, but the fields which were not unusually well done lost about 30 lbs. of Nitrogen per acre. Some of the loss on the fallow plot could have been prevented by sowing Mustard or other quick growing crop in September. This could have been fed off or ploughed in, thus holding the Nitrogen in less soluble form until the spring. The obvious lesson is that land which has been got into good condition in autumn should at once be sown with either the crop it is intended to carry or a catch crop."

A green dressing established on the land following an application of Nitrates, especially if wet weather is to be expected, is undoubtedly a good thing and it goes far to prevent loss by leaching. In the case of Coffee, however, this is not always possible on account of the shade, which prevents the green dressing growing.

Bird Life on Estates.

At a Meeting of the Dimbula Planters' Association, Ceylon, held on 22nd May, 1916, the following interesting letter from the Assistant Entomologist was read.

"I have noticed that the plant you sent (the Tallow Tree, *Sapium* "
"*sebiferum*) has a strong attraction for many species of insectivorous"
"birds, as well as frugiferous ones, and it would, therefore be very likely"
"to lead to a large increase of bird life on estates if planted up along"
"ravines, etc. The Mulberry Tree and the China Guava are also good"
"for this purpose."

"In my opinion the principle reason for the paucity of bird life on all"
"Up-country estates lies in the total absence of suitable places for nesting"
"in. Albizzias, Grevileas, and Dadaps afford nesting places for very few"
"kinds of birds, especially as they are usually too much spread about to"
"act as real sanctuary. There is no doubt that if all ravines were planted"
"up thickly with harmless berry bearing shrubs and creepers the small"
"birds would speedily increase markedly."

"Birds play a much more important part in the destruction of both"
"animal and vegetable pests than is generally supposed, and it is probable"
"that if they were more encouraged on estates they would help very"
"materially in keeping down such pests as Tortrix and other caterpillars."
"In America the value of birds is being strongly realised and they are"
"encouraged by providing them with artificial nest houses, winter feeding,"
"etc. In Ceylon nest boxes would attract tits, magpies, robins, possibly"
"fly-catchers and several others if set high up in trees where podians"
"would not be likely to rob them."

RUDOLPH D. ANSTEAD,
Deputy Director of Agriculture, Planting Districts.

DISTRICT PLANTERS' ASSOCIATIONS.

Mundakayam Planters' Association.

Proceedings of the Second Quarterly General Meeting of the Mundakayam Planters' Association held at the Mundakayam Club on Saturday 24th June 1916, at 10 a. m.

PRESENT.—Messrs. H. M. E. Howson (Chairman), J. A. Richardson, E. Vincent, W. F. Stephen, C. Hendry, T. W. H. Fitchett, H. B. Kirk, B. Macpherson, S. P. Eaton (Honorary Secretary) and by proxy Messrs. Wm. Hendry, J. J. Murphy, E. E. Eyre and G. H. Danvers Davy. *Visitor.*—Mr. J. S. Wilkie.

Proceedings of the last Meeting were taken as read and confirmed.

DOUBLE EXPORT DUTY ON TEA.—Mr. Richardson informed the Meeting of the exact position of affairs and after some discussion, it was decided everything possible was being done and no further steps were necessary at present.

ELECTION OF PLANTING MEMBER.—A representative to the Legislative Council was elected at the Meeting, after Mr. Richardson had explained that he was not standing as a candidate and had never intended that his name should be proposed in this connection.

ELECTION OF BANGALORE DELEGATE.—Mr. S. P. Eaton was elected as the Representative of this Association. Mr. Vincent proposed a resolution seconded by Mr. Fitchett "That the Bangalore Delegate be instructed to bring up the question of nomination of candidates for the position of Additional Planting Member of the Legislative Council," as in the opinion of the Meeting there should be a definite ruling on this point, to avoid misunderstandings arising.

TOWN IMPROVEMENT COMMITTEE.—Read letter from Mr. Robinson, Commissioner, Devicolam, of 9th June 1916, giving a history of how this matter stands at present, and requesting to know of Government's behalf whether the Association wished to proceed further with the scheme. It was ultimately resolved that nothing definite should be decided until the Committee had had an opportunity of Meeting Mr. Robinson. Mr. Robinson was heartily thanked for all the trouble he had taken and the Honorary Secretary was instructed to write him in the above terms.

REPORT OF THE RUBBER GROWERS' ASSOCIATION DELEGATE.—Mr. Howson made some brief remarks and after discussion it was resolved to leave over any further action till more information had been received from London. A vote of thanks to Mr. Howson was unanimously passed.

CORRESPONDENCE.—Read letter from the Honorary Secretary, Travancore Combined Planters' Association *re* timber values. Mr. Richardson gave the meeting particulars of an interview he had with the Dewan and he hoped that as a result of that interview more favourable terms would be granted as regards Land Purchase. The Chairman spoke in appreciation of Mr. Richardson's efforts on our behalf and thanked him for all the trouble he had taken.

A complete list of the members of this Association who have joined His Majesty's forces was drawn up and the Honorary Secretary was instructed to forward a copy of same to the Secretary of the U. P. A. S. I. as requested by him.

The statements of one of the Sri Mulam delegates at the last Popular Assembly with reference to the profits made on Tea and Rubber in this State were discussed. This meeting wished to record their disapproval of these remarks which were considered inaccurate and misleading. The average profits on tea and rubber are very much below those stated, even at the present time of high prices and unexampled prosperity. His statement that "capital, labour and everything is foreign" and that "neither the State nor the people are benefited" is absurd. A very large amount of local labour is employed and the benefit to the country is enormous, and is proved by the extremely prosperous condition of all planting Districts.

With a vote of thanks to the Chairman the meeting closed.

(Signed) H. M. E. HOWSON,
Chairman.

(„) S. P. EATON,
Honorary Secretary.

Shevaroy Planters' Association.

Proceedings of a Quarterly General Meeting of the Shevaroy Planters' Association held at Victoria Rooms, Yercaud, on the 29th June, 1916.

PRESENT.—Revd. Father Capelle, Messrs. F. Carey, S. Campbell, E. Travers-Drapes, S. M. Hight, C. L. Hight, C. G. Lechler, J. C. Large, W. Rahm, C. Rahm,—Wooduviss and Chas. Dickins (Honorary Secretary). Also Mr. A. G. Nicholson by his *proxy* Mr. E. Travers-Drapes (3 votes) and Mr. D. S. Robinson by his *proxy* Mr. C. Rahm.

(1) The notice calling the meeting was taken as read.

(2) THE LATE EARL KITCHENER.—Before the business on the Agenda was taken up, the Honorary Secretary made a few remarks touching the profound shock caused to the Nation by the death of Lord Kitchener and moved the following resolution :

"That this Association do place on record that it mourns with the British Empire in the great loss it has sustained."

The motion was unanimously carried, all members standing.

(3) ELECTION OF PLANTING MEMBER.—Read "Vote of thanks to the Planting Member" page 103, Book of Proceedings 1915, and letter from the Hon'ble Mr. Barber after which the election took place with the result that the Hon'ble Mr. Barber was elected.

(4) ELECTION OF AUDITORS TO CHECK S. P. A. ACCOUNTS BEFORE A. G. MEETING.—Messrs. C. Rahm and E. Travers-Drapes were elected Auditors,

(5) ELECTION OF DELEGATE.—Mr. E. Travers-Drapes was unanimously elected to represent the Association at the coming U. P. A. S. I. Meeting. If circumstances prevented his going, Mr. S. M. Hight was elected to take his place.

(6) U. P. A. S. I. AGENDA PAPER.—The subjects on the Agenda were discussed and the Delegate instructed to again bring up the subject of Feeder Roads on the Shevaroys, also with reference to a letter dated 29-4-16 from the District Tahsildar, Yercaud, containing a circular (dated 25-2-13 Salem District Magistrate's Office) which was printed and circulated by the Honorary Secretary to all members in connection with High Court ruling that Magistrates convicting persons under Act 13 of 1859 cannot order the convicted person to pay court fees to the complainant. It therefore seems necessary that the Act should be amended so as to enable Magistrates to order the repayment of such fees, and that the matter be placed before the coming U. P. A. S. I. Meeting and the Honorary Secretary be requested to give notice to the Secretary U. P. A. S. I. on the subject.

(7) Read G. O. No. 101, dated 12th January, 1916 addressed to this Association.

(8) With a vote of thanks to the Chair the meeting terminated.

(Signed) CHAS. DICKINS,
Honorary Secretary, S. P. A.

Bababudin Planters' Association.

Proceedings of a Quarterly General Meeting held at Santaveri, on Wednesday, July 5th, 1916.

PRESENT.—Messrs. A. C. W. Denne, F. Hugonin, H. Kerr, F. D. Meppen, A. B. Smart, C. Sylk, (Vice-President), S. J. Wilson and S. H. Dennis (Honorary Secretary.)

The minutes of the last meeting were confirmed.

(1) SCIENTIFIC DEPARTMENT.—The Madras Government's letter dated April 5th, 1916 *re* the new scheme was read.

(2) EXPERIMENTAL COFFEE STATION.—A letter from the Honorary Secretary, Coorg Planters' Association, was read, his suggestion, that the proposed Coffee Experimental Station should be located in the Suntikoppa District, Coorg, was agreed to.

(3) ASSISTANT SCIENTIFIC OFFICER FOR MYSORE.—The question of the renewal, or otherwise of this Gentleman's agreement which terminates next April, was before the meeting. The following resolution, proposed by Mr. Kerr and seconded by Mr. Wilson, was carried, 3 members not voting :—

> " That the services of the Assistant Scientific Officer for Mysore,"
> " on the completion of his 5 years agreement next April, be "
> " retained from year to year pending the introduction of the "
> " Madras Government's new Scientific scheme, provided the "
> " A. S. O. would accept such terms,"

Certain correspondence between the Deputy Director of Agriculture, Planting Districts, and the Council of Mysore Planters' Associations, was read by our representative on the "Council."

The following resolution was proposed by Mr. Denne, seconded by Mr. Wilson, and carried unanimously :—

"That while leaving the matter in dispute to the Chairman and"
"Councillors of the U.P.A.S.I., this Association would be glad"
"to see an end of the present unsatisfactory state of affairs,"
"and would prefer the control of the A. S O. being left to the"
"C. of M. P. A."

PEST ACT.—Dr. Leslie C. Coleman's letter was read, and a vote of thanks was carried, for his valuable opinion.

ROADS.—The Secretary to Government, Revenue Department's letter with reference to the toll-gate on the Bababudan Hill Road, and the Executive Engineer Kadur Division's letter, *re* the Birur-Lingadhully road, and proposed new Kulhuttypur-Hebbe road, were read and discussed, the meeting regretted the unsatisfactory replies.

The Honorary Secretary was requested to approach the Deputy Commissioner, Kadur District, to appoint a member of the Association to the District Board, there now being a vacancy, *vide* his letter dated 6th May, 1912, in reply to our resolution carried at a meeting held on the 25th April 1912.

SANTAVERI DISPENSARY.—The Honorary Secretary was requested to write to the Special Revenue Officer, M.I.S. Kadur and Hassan Districts, quoting the Secretary to Government's letter, and to enquire when funds are likely to be available for the opening of a Dispensary at Santaveri.

EUROPEAN DOCTOR.—The South Mysore Planters' Association's proposal, to have a European Doctor resident in Chickmaglur for the benefit of the Europeans in the 3 Districts, was read to the meeting, and considered impracticable.

ELECTION OF PLANTING MEMBER.—The Hon'ble Mr. E. F. Barber's and Mr. J. A. Richardson's letters were read.

The Hon'ble Mr. E. F. Barber was unanimously re-elected Planting Member.

ELECTION OF DELEGATES TO U. P. A. S. I. ANNUAL MEETING.—Messrs. L E. Kirwan and S. H. Dennis were elected to represent the Association.

The preliminary draft agenda was gone through and the Delegates received their instructions.

The meeting closed with a vote of thanks to Mr. Denne for the use of his Bungalow, and to the Chairman for presiding.

(Signed) C. SYLK,
Chairman.
(„) S. H. DENNIS,
Honorary Secretary.

MARKETS, PRICES, AND STATISTICS.

Coffee.

Brazil receipts :—

	1916.	1915.
To 10th June	14,453,000	12,466,000
To 17th June	14,597,000	12,582,000

Monthly Statistics to 31st May.

	1916.	1915.
East Indian—	tons.	tons.
Landed to 31st May	1,930	2,385
Delivered to 31st May	937	1,926
Stock on 31st May	1,879	1,916
Coffee of all kinds—		
Stock in U. K. on 31st May ...	33,000	20,800
Total European imports 31st May ...	178,700	264.650
Total European deliveries 31st May ...	179,415	158,065
Total European Stock on 31st May ...	205,590	262,410
World's visible supply on 31st May ...	457,470*	484,410

*A decrease of 35,530 as compared with a decrease of 43,470 tons last year.

Offerings at auction have been :—

—	6—9 June.	13—16 June.	Total since 1st Jan.	Last year.
East Indian ...	372	271	24,804	23,061
Costa Rica ...	1,400	1,405	77,742	75,290
Other Milds ...	38	701	54,064	103,461
Brazil ...	2,351	Nil.	49,557	83,046
Robusta ...	Nil.	149	776	11,989
B. E. A. & Uganda ...	Nil.	Nil.	7,454	8,967

The following prices have been received for South Indian Coffee :—

—	No. 1.		No. 2.		No. 3.		PB.		T.		Extra.	
MYSORE.												
Santawerry ...	40	80/-	43	74/-	6	70/6	11	80/6	10	69/6	...	...
	43	N.	...	...	...	...	...	...	...	...	...	...
	102	81/-	64	73/6	9	70/6	21	84/-	21	70/6	...	...
NILGIRIS.												
Suffolk ...	66	76/-	97	72/6	...	...	...	...	...	...	1	80 -
Glenvans ...	22	N.	39	N.	7	69/-	...	...	15	69/6	18	N.

The small supply offered in auction met a fair demand, the portion sold showing steady prices. Privately there was very little doing. If Archangel is opened for commercial traffic at the end of June it should bring more business, not only in Coffee but in other produce. 100,000 bags of Valorization stock in Havre are to be put on the market.

Tea exported to the United Kingdom during the second half of June.

	1916.	1915.
From Calcutta ...	6,930,073	7,228,259
From Chittagong ...	2,558,141	1,828,930
Total from 1st April 1916 to 30th June 1916		
From Calcutta ...	18,236,580	
From Chittagong ...	9,346,471	
Total...	27,583,051	21,427,912

PRICES.

Calcutta prices 6th June were—

	1916. as. p.	1915. as. p.
Lowest leaf ...	7 0	9 9
Even leaf pekoe souchong ...	7 6	10 3
Lowest broken ...	7 2	10 0
Common broken ...	8 0	10 6
Low pekoes ...	8 0	10 6

The following prices have been obtained for South Indian Tea :—

—	B.O.P.	O. P.	Pek.	B. P.	P. S.	P.F.	Fgs.	Dust.
TRAVANCORE.								
Cherakara ...	11½	...	...	...	...	...	...	...
Penshurst ..	1/-¼	...	11½	...	11¼	...	11¼	...
Wentworth ...	11¼	1/-	11¼	11½	10¾	...	...	10¼
Thungamullay ...	1/-¼	...	11	11¼	10½	10¾	...	...
Kolliekanum ...	1/-	...	11	11½	...	...	...	...
Touramulla ...	1/-	...	11½	11¾	...	...	...	10¼
Bon Ami ...	1/-	...	11	11¾	...	...	...	...
Carady Goody ...	...	1/-¼	11½	11¾	11½	...	...	...
Ladrum ...	1/-½	...	...	1/-	...	...	11¾	...
Mount ...	1/1	1/-¼	11½	1/-	11¼	...	11¼	10½
Poonmudi ...	11¾	...	11¾	11¾	...	...	...	...
Vembenard ...	1/-½	...	...	1/-	11	...	...	...
Granby ...	1/-½	...	11½	1/-¼	11½	...	...	...
White Hills ...	...	...	11¾	1/-	...	...	...	...
New Hope ...	11¾	11¾	11½	...	11¼	...	...	...
Munja Mallai ...	1/-	...	11½	11¾	...	11¼	...	10¼
NILGIRIS.								
Daverashola ...	...	1/1¼	...	...	...	...	...	...
Nonsuch ...	1/1¼	1/2	1/1	...	...	...	...	...
Wentworth ...	1/-	1/-½	11¾	1/-	...	...	...	10¾
Richmond ...	11	11½	11¼	11½	...	...	10¼	...
WYNAAD.								
Pootoomulla ...	...	...	11¾	...	...	...	...	...
Panora ...	1/-	...	...	11¾	11½	11½	...	...

R. D. A.

CORRESPONDENCE.

Bangalore, 10th July, 1916.

The Labour Question.

THE EDITOR,

Planters' Chronicle.

Dear Sir,—The letter from *Ut Veniant Omnes* in your issue of July 1st deserves fuller treatment than the time at my disposal permits me to give it just now. His courage is splendid. The weak point in it is that without combination among planters none of his suggestions can be carried out. If we cannot combine to reduce advances, I do not see how combination to do away with them altogether can be expected.

His suggestion is by no means new. Mr. Chisholm of Coorg years ago hammered into us that advances were unnecessary and should not be given. He refused to give any himself and told us he worked his Coffee Estates in Coorg without them. How it is done is another matter.

The original necessity for advances was twofold :—

1. Coolies were in debt to their landlords in the villages, and it was recognized that they should not leave for Estate work until they had cleared themselves of these debts. We carry out the same idea still among ourselves. It would not be etiquette for me to take coolies from the Estate of "Ut Veniant Omnes" without paying off their debts to him.

2. The bitter experience of labourers all over the world in times more or less distant, was that they were apt to be disappointed by their employers. Promises of regular work and regular pay at certain rates were not adhered to. The want of "flush" (or its equivalent) might cause work to be reduced at certain seasons from 6 days to 4 days a week. Coolies engaged at 6 annas a day were paid off at 5 annas a day because the employer as sole arbiter considered when the work was finished, that on the whole it was not quite up to the standard. "Ut Veniant Omnes" knowing me so well, will remember that I do not make statements without being able to quote Chapter and Verse.

Coolies therefore wanted as much as they could get by way of "earnest money." At any rate this cash was in their pocket against the promises actual and implied of the prospective employer who asked them to leave their homes. I must say I have a sneaking sympathy with the coolies in this matter, although I do not believe a single one of them could give expression to the "earnest money" idea. It is an instinct inherited from forefathers who had been done in the eye, and subconscious.

Taking all employers of labour in say Malaya, Ceylon, and S. India, can it be said we have been altogether free from reproach? Is the cooly's demand for advance quite unjustified? Some heart searching is necessary. In the vast majority of cases I am glad to think it is absolutely unjustified, and I am willing to admit for the sake of argument that the coolies now employed on Estates have no debts in their villages, and know by personal experience that "earnest money" is not necessary. Still, the number of coolies out of debt and with personal experience of Estate work, is not sufficient to go round. They breed, but not fast enough to meet requirements. The demand increases while the supply of these particular coolies is stationary. People new to the work, with debts and wanting in personal experience have to be sought and induced to take up work

on Estates. They will not leave their homes without cash to pay off their debts or as earnest money. Is it possible to advance these people and withhold it from old connections? It would certainly be considered an injustice by the latter. They are tried hands, coming year after year to Estates, working off their advances in the great majority of cases. Are we to withhold a privilege from them which we have to extend to raw hands who have still to be taught their work? To my mind, and I have given it much study, some advance is still necessary. With our old connections it is now-a-days a bribe to come to work pure and simple and to keep them contented. We go on competing with each other to see who will give the biggest bribe. By whole hearted and loyal co-operation it can be kept at a reasonable and uniform figure, without causing justifiable dissatisfaction.

Ut Veniant Omnes is not satisfied with my last report. My recollection of it is that it was a record of work done, and an appeal for combination and co-operation. What parables I explained by metaphors I cannot think. Our real trouble is want of combination. Given combination we might achieve wonders. Partial combination means partial success. Combination in its fullest and most adequate form means complete success. Yet, it is wanting.

I must thank your correspondent for the kind way in which he refers to me and my difficulties, but as for the Premiership of the new Irish Parliament, the sort of unanimity that is likely to prevail in that august Assembly will be of the Kilkenny Cat variety. If I can't get my present constituents to attend to the words of ancient wisdom uttered at the time of the birth of St. Patrick "*Don't be always dividin' but sometimes combine*," I have not much chance of success on the Banks of the Liffey.

Yours faithfully,

AYLMER Ff. MARTIN.

Cowcoody, Somwarpet,
N. Coorg, July 6, 1916.

Manure Price Lists.

THE EDITOR,
Planters' Chronicle.

Dear Sir,—Now that prices are being published in the *Planters' Chronicle*, I should like to suggest that the leading manure firms in India be invited to publish their prices of standard manures monthly in the *Planters' Chronicle*. Until the much-to-be-desired co-operative purchase of manures comes along, the difficulties of the small proprietor wishing to buy manures in the cheapest market are considerable. Some firms publish lists largely in excess of what they are prepared to take; others say that their last price list received is hopelessly out of date,—to the tune of 20 per cent., or so, others wish to know what other firms have offered before quoting, and so on. In the case of the Chili Nitrate Propaganda, no prices are quoted at all.

Yours faithfully,

L. NEWCOME.

THE EDITOR,

Planters' Chronicle,

Bangalore.

Spraying for Leaf Disease.

Sir,—I welcome Mr. Martin into the discussion as our opinions seem to be opposed, and some one may find between them the golden mean.

Now, as regards the resting places of L. D. spores, I am firmly convinced that the mulch is the chief one, though jungle trees may harbour them, and other hosts outside the coffee may exist. To the opinion that these spores lie up in the mulch and can be scotched, I think Mr. Frattini's spraying, Mr. Lake's burying, and my smothering by imported earth give some support.

Mr. Martin objects to clean digging, of the results of which he draws a harrowing and often true picture, and there I am with him; but I advocated clean digging "where advisable" and I do not think clean digging on either flat or steep land advisable during heavy rains, or *after* the L. D. has got hold of the trees. Before or after the monsoon—before the monsoon "go," or before the Xmas "go"—is what I believe in, and in neither case should the soil puddle. But I would have no objection to "renovating" in fairly heavy rain, as the puddled surface can be broken up later. I am not much in fear of cut roots as these soon find their home below the harried portion of the soil, and the rain will take any surface manure to them. Mamooty digging can break branches certainly, but this might be arranged amicably (or otherwise) with the coolies—while cutting the ever-spreading roots of the shade trees would have a most beneficial effect on the coffee.

I would cover up mulch in March-April-May, (whenever the fine weather attack has disappeared), and this would be much facilitated by having renovation pits ready for the mulch to be scraped into, possibly limed, and covered up. This would have, I think, a great effect on the monsoon attack. Digging or renovating after the monsoon, and before the usual December-January attack, should have an ameliorating effect on the latter, I think it would probably pay to delay pruning and other work after crop, in order to get the mulch out of the way before conditions encourage the germination of spores. Sweeping into renovation pits and covering would be fairly quick work—turning in mulch when manure or lime has been applied would help. There are difficulties no doubt, and no one will get his whole estate comparatively free the first year. Spraying the trees does not take my fancy, but that is a form of battle that many may like and find useful. I prefer to go for the mulch—but if Mr. Martin does not believe that the L. D. spores lie up in this, no burying or spraying of it will of course recommend itself to him.

It would be interesting to have scientific opinion on this point, beyond that of our young and recent Scientific Assistant—whose opinion I am encouraged to see agrees with mine. And so many seem to think that they have derived benefit from this mulch burying, that one feels there must be something in it, and that it deserves to be further investigated.

As regards Mr. Martin s statement that L. D. likes "dry" weather, my experience is the exact opposite. Fine weather yes, but not "dry." What encourages it to break out on my bushes is "warm moisture." It comes in June and July, if the weather be sunny. (I have it now showing up after the light weather of the last fortnight) and it usually comes in the break of August and September, because then the warmth and moisture encourage spore-germination. In December-January it usually breaks out after a spell of heavy dews, or when Xmas or January rains produce the

necessary condition of warm moisture. The reason it shows up late in Mr. Martin's hollows is probably because they are *cold*, and the sun does not warm up dew and mulch there, while the East and South facings are more genial and get the sun (or at any rate warm air) on the bedewed mulch.

Leaf Disease does not like dry and strong East winds with me, those are what discourage it more than anything else, and I put down my unusual attacks in December—January during the last two years to the fact that east wind was in great deficiency, while last year moisture was higher than usual.

Has Mr. Martin observed bad leaf disease *begin* more often after a spell of strong dry east wind than after, say, a shower in December? Unless a very dry month has preceded such a shower, and paralysed the spores, L. D. is a certainty.

I write chiefly of the Ghauts, and a rainfall of 150 ins. and more. As regards time of digging, spraying, etc., each man must judge this to suit his own conditions, just as he picks his crop when it is ripe, and not when some one else's is.

Turning to Mr. Leslie Rogers able letter, I can only say that though his advice is good as regards bringing round old coffee, many of us have done all these things, and yet L. D. persists. It may "blow in" of course—but while cordially agreeing that the main point is to keep your tree vigorous and healthy, I cannot help thinking that a local application of something nasty to the mulch would very considerably aid us.

Yours faithfully,

C. DANVERS.

July 10th, 1916.

THE EDITOR,

Planters' Chronicle,

Bangalore.

Spraying for Leaf Disease.

Sir,—I have read with much interest the correspondence in your columns on the above subject. While looking up this disease in a text book, that contained the summary of the opinions gleaned from all sources, I came across the following: "When leaf disease is at all serious it is so prevalent as to render most of the methods of treatment, quite impracticable. Spraying with fungicides, such as the Bordeaux Mixture, sulphuring the leaves, removing and burning the leaves, have each and all been advocated and tried with varying, though never with complete, success. The best results as yet recorded have been attained by producing a stronger, more vigorous plant, through increasing the spacing, lessening the shade, improving the drainage, manuring liberally, and not over pruning. There would seem little doubt that had Ceylon planters cultivated and manured their estates more thoroughly and systematically than they did their industry might have been saved. When the disease appeared both soil and plant were exhausted."

From the above it will be noted that Spraying with Bordeaux is by no means a new idea for coffee leaf disease. It is my opinion that though the covering of the leaves with a compound on which the spores of Hemileia cannot breed, would be a most useful work, still it will not make up for any neglect in Tillage and that it is only by the judicious carrying out of the latter at the right time, that the so-called exhaustion of the soil is prevented, and the consequent loss of vitality of the trees growing thereon.

My experience has been that though one may give up certain works for a few years, without the coffee showing any falling off in looks, still sooner or later the result is the same, the plants sicken and leaf disease increases, and pest generally, and to get the plants back to health one has to cultivate in wet weather, thoroughly opening up soil and burying all mulch. This to me seems to change the mechanical condition of the soil and also most likely causes great activity in soil bacteria, so that the new roots thrown out have no difficulty in their feeders obtaining food just when wanted, *i.e.*, when fruit is nearly mature, and the tree is most likely to suffer if its food is hard to get. I think that it is for this reason that one notices the general improvement of the trees after a wet weather dig, or renovate, and though the burying in of all diseased leaves, etc., without doubt prevents an enormous amount of spores coming available for the further infection of healthy leaves, still the main thing is, that the vitality of the tree itself has been generally improved, and therefore rendered more able to resist diseases.

As regards the effect that Spraying with a fungicide is going to have on the fungi of Green Bug? I have my doubts; as I think I am right in saying that we have two fungi working on this Pest, and that they pretty well overlap with the periods one would have to spray for leaf rot, or disease, so one would be bound to interfere with one of them. Here also it seems that any cultivation that will generally increase the vitality of trees, is more likely to be the sound basis to work on than to rely on spraying. It is a well known fact that Ceylon coffee had been so weakened by Hemileia caused, in the opinion of most investigators, by want of soil and other works, that the Green Bug when it arrived in the Island had sickly trees to work on with the consequent result.

Hence one arrives at the fact. Keep your trees in good heart by judicious cultivation, and you stand the best chance of their being able to resist disease. Spray by all means if you can afford it, but do not rely on it to make up for neglect of other works.

Yours faithfully,

E. W. R.

Saklaspur P. O.

A Possible New Source of Potash.

Judging by the following paragraph which appeared in the *Louisiana Planter* of 4th March, there would appear to be grounds for hope that the world will not be dependent on Stassfurt for supplies of potash manures during or after the war:—

"And now New Mexico is going to beat Germany at least so the Press despatches seem to indicate. In the Panhandle of Texas, in Oklahoma and New Mexico, Permian red beds have been discovered containing inexhaustible quantities of potash that will make every cane and best field blossom with abundance, and the land will drop fatness to astonish all planters. At Lesbia, New Mexico, large salt beds were penetrated at a depth of several hundred feet, and they found peculiar red shale and sandstone with a potash-bearing deposit, and that the dip was close to the earth's surface. In 1913, the United States imported 12,000,000 dollars' worth of kali from Germany, and if New Mexico will come forward and cast a hedge about America, guaranteeing that all this money will stay here, generations to come will rise and call her blessed. Here's hoping that the faith has decent substance behind it."—*Queensland Agricultural Journal.*

The Planters' Chronicle.

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THE U. P. A. S. I.

(INCORPORATED.)

Contents.

We publish the proceedings of the South Mysore, The Central Travancore, Anamalai and Wynaad Planters' Associations.

We hope next week's issue to publish the list of Delegates who are attending the Annual General Meeting, but Messrs. C. Lake, W. H. G. Leahy, J. Hatton Robinson and C. E. Abbott have been elected by the above Associations respectively.

A valuable report on the Mechanical Drying of Coffee on the Estate by Mr. W. H. Reed and the Deputy Director of Agriculture will be read with great interest by all Coffee planters. A table of machine dried coffee is given. The outstanding factors are labour saving and evenness of drying.

The correspondence about the Spraying for Leaf Disease still continues to interest coffee planters.

We would call attention to the letter from Mr. Barton acknowledging the receipt of two boxes of Tea from Mr. J. Stewart to whom he expresses gratefulness for a gift so much appreciated in the thirsty country from which he writes.

The following particulars have just reached us of 2nd Lieut. J. H. Parkinson killed in action: Mr. J. H. Parkinson was Superintendent of Koravantavalam Estate, South Travancore since 1911, having been on Duranpitiya Estate, Ceylon, for several years previous. He was at home at the outbreak of war and enlisted in the Rifle Brigade, he was afterwards attached to the 7th Air Squadron as a despatch rider and saw much service in France. At the end of 1915 he took a Commission in a Machine Gun Corps, in which capacity he again went to the front. Mr. Parkinson represented the South Travancore Planters' Assooiation at Bangalore in 1913, and will be missed by his many friends in Travancore where he was very popular.

We would wish to bring to the notice of Honorary Secretaries of District Associations, that an application has reached us from a Medical Officer who is open to employment. He can speak Tamil, Telegu and Kanarese and having worked in India has an extensive knowledge of the coolies habits and customs, his needs, requirements and prejudices. The editor will be pleased to furnish further particulars on application.

DISTRICT PLANTERS' ASSOCIATIONS.

South Mysore Planters' Association.

Proceedings of a General Meeting held at the Travellers' Bungalow, Mudigere, 1st July, 1916.

PRESENT.—Messrs. C. Lake (President), C. J. Hayward, C. H. Godfrey, K. Thamaya, M. J. Woodbridge, P. Hunt, A. Thomson, St. John Hunt (Honorary Secretary). *Visitor*:—K. T. Seshaiya, Mr. E. V. Hunt's *proxy* was ruled out of order.

The Minutes of the last Meeting were passed.

Election of Planting Member.—The ballot resulted in Mr. E. F. Barber being returned.

U. P. A. S. I. Delegate.—Mr. C. Lake was elected.

Delegate to the Mysore Dassara Assembly.—Mr. C. T. Hayward was elected.

Carrying on of the Assistant Scientific Department after termination of present Agreement.—It was proposed by Mr. M. J. Woodbridge and seconded by Mr. A. Thomson that the North Mysore Association's resolution be adopted *viz.* "It was proposed by Mr. Danvers and seconded by Mr. Hight. That as Government is taking over the Scientific Department as soon as funds are available, it would be inadvisable to make a long agreement with the Assistant Scientific Officer, and that under these circumstances he be asked to remain, on the completion of his present term, on a yearly agreement until Government is able to fully organise the new Department, and that members of the Association be asked their opinions on this by post cards, on receipt of which the Assistant Scientific Officer may be approached through the Council and ascertain if he will agree to these terms."

And, that a circular be drawn up and sent round to members explaining, that as favourable results are being obtained in combating black rot, and that the same treatment appears to have a detrimental effect on leaf disease, that it would be a short-sighted policy not to continue Mr. Frattini's services at this juncture.—*Carried.*

Mr. R. D. Anstead's Correspondence in connection with Mr. Frattini's latest Bulletin.—It was proposed by Mr. C. H. Godfrey and seconded by Mr. C. J. Hayward that in the opinion of this Meeting, this case should be left to the decision of the U. P. A. Council, and further, the present seemed a welcome opportunity to end the un-workable dual control of the Assistant Scientific Officer, and Mr. Anstead having desired to sever his connection with the Mysore Scientific Department, the Mysore Council are prepared to carry on the same on their own.—*Carried.*

Locality for Coffee Experimental Station.—Read correspondence on this matter and Suntikoppa was considered a desirable locality.

European Medical Officer.—Read letters from the North Mysore and Bababudin Planters' Associations. It was decided to reserve this matter for future discussion.

Arsikere-Mangalore Railway.—The Delegate to the U. P. A. S. I. Annual Meeting was asked to bring this matter up.

Roads and Communications.—This important subject was discussed with the following results.

It was proposed by Mr. A. Thomson and seconded by Mr. Woodbridge with regard to the Gonibede-Annamall Road. "That the practice of the Executive Engineer, Hassan District in permitting the material collected for repairing the road, to be stacked in the side drains and left there during

the monsoon is fatal to the road, there being water channels a foot deep in mile 11—12 and the general condition from mile 1 to 12—13 requires special attention." The above resolution to be forwarded to the Chief Engineer. It was also proposed by Mr. St. John Hunt and seconded by Mr. Hayward, that owing to the appalling state of the Belur-Mudigere road *via* Gonibede, between Mile-stones 29 and 49, *and* the difficulty in procuring a good quality of metal, the Chief Engineer be requested to allot special grants where such are not allotted, and especially between mile-stones 39 to 49 an enhanced rate be allowed, as existing rates have *proved* a loss to contractors and no contractor will look at the work a second time.

It was also resolved that all the resolutions passed in the last two years regarding the bad state of the Malnaad Roads be sent to the Chief Engineer, and that it be pointed out that in spite of the slight improvement recently noted the roads are being allowed to fall into a deplorable state again.

Notice with regard to the Re-survey of land in each Taluk.—It was resolved that the Revenue, Re-Survey Superintendent be written to and requested that due notice be given of when the re-survey of land in each Taluk will take place.

The Amrat Mahal Department.—It was proposed by Mr. C. H. Godfrey and Seconded by Mr. A. Thomson, that this Association views with regret the attack made at the Mysore Economic Conference on the Mysore Amrat-Mahal Department, which it considers has in the past, and will, it is hoped in the future, continue to do valuable work in preserving and improving the celebrated breed of Mysore bullocks, which is essential for transport work in the State.

Payment of Tax on Coffee Estates or other large holdings by cheque. The Delegate to the Dassara Assembly at Mysore was instructed to bring this matter up.

Election of Member.—Mr. K. T. Seshaiya was elected a personal member of the Association.

Correspondence.—Matters of interest were read to the Meeting.

With a vote of thanks to the Chair the Meeting terminated.

C. LAKE,
President.

ST. JOHN HUNT,
Honorary Secretary.

Central Travancore Planters' Association.

Proceedings of Second Quarterly Meeting of Central Travancore Planters' Association held at Travellers' Bungalow, Peermade on Saturday July 1st, 1916, at 10 a.m.

PRESENT.—Messrs. F. Bissett (Chairman), J. S. Wilkie, H. C. Westaway, C. A. Mackenzie, F. W. Winterbotham and W. A. J. Milner.

1. The minutes of the last meeting were taken as read and confirmed.
2. All correspondence since the last meeting was read.

EXPORT DUTY.—Read letter dated 26th May from Secretary U P.A.S.I. giving a summary of his letter dated 10th May to Sir William Meyer, Finance Member of Council, regarding the double export duty. This met with approval. It was also noted that no reply had so far been received to this letter.

TIMBER VALUES.—Read letter dated 21st June from Honorary Secretary, Travancore Combined Planters' Association, on this subject; it was decided to bring this up again at the next quarterly meeting.

Read letter dated 9th May from Munnar from the British Resident, stating that he would be returning to Trivandrum sometime in June and would then discuss this matter with the Dewan. The Honorary Secretary was instructed to write and enquire the result of this interview.

REVISION OF RULES.—Replies to the Honorary Secretary's circular regarding alteration of voting powers were read. The matter was discussed and Mr. H. C. Westaway gave notice of the following resolution to be proposed by him at the next meeting:—

> "That the subject of the Association Rules be thoroughly gone into at the 3rd Quarterly Meeting and brought up for submission to the Annual Meeting."

TEA THEFTS COMMITTEE.—The members of this Committee were duly circularised with the result that Mr. C. A. Mackenzie was appointed Secretary. Mr. Mackenzie stated that he had taken over all the correspondence on this subject on the Association files and would arrange a meeting of this Committee as soon as possible.

MAILS.—Correspondence regarding this was read. The Honorary Secretary was asked to write to the Post Master General, Madras, to enquire why the delivery of Peermade mails should be relatively 2 whole days later than Mundakayam mails. It was explained that letters posted in Madras on (say) Tuesday reach Mundakayam Post Office on Thursday at 2 P.M., in time for delivery to Estates the same day. A letter for Peermade however posted on a Tuesday in Madras would only be delivered to Estates on the Saturday.

FREIGHT ON TEA SEED.—Read letter dated 15th May from Secretary U. P. A. S. I., stating that from 1st June 1916 tea seed booked by passenger train will be charged at half parcel rate at OR in local booking over S. I. Railway and in through booking with Foreign Railways. Recorded.

MADRAS WAR FUND.—Read letter dated 16th June to Secretary U.P.A.S.I., from the Military Secretary to H. E. the Governor of Madras, dated Ootacamund, 9th June, as follows:—

> "Messrs. Parry and Co., Madras, have passed on to me a cheque for Rs. 342-15-0 being the sale proceeds of samples of tea, coffee, and rubber, etc., exhibited by the members of your Association at the Madras Exhibition. I have passed on the amount to the account of the Hon. Secretary Madras War Fund, as your donation. His Excellency has asked me to convey his warm thanks to you and through you to the Members of the Association for their patriotic assistance."

3. ELECTION OF BANGALORE DELEGATE.—It was proposed by Mr. Westaway and seconded by Mr. Milner.

"That Mr. W. H. G. Leahy be asked to attend the Annual U. P. A. S. I. Meeting on August 14th as our delegate."

It was resolved that the delegate be allowed Rs.200 travelling expenses. —Carried unanimously.

4. U. P. A. S. I. AGENDA (SUBJECTS FOR THE DELEGATE)

SCIENTIFIC DEPARTMENT.—Resolved that the 'Site of the Experimental Station' be either on Woodlands, Glenmary or Stagbrook, the choice of the actual plot being left to Mr. Anstead. It was explained that 20 acres of tea will be required which will have to be divided up into acre plots by cutting out a row of tea. As regards buildings for the staff, Rs.10,000 has been allowed for the mycologist's Bungalow, Rs.800 for native assistant's bungalow and Rs.1,200 for lines etc.

SHIPPING FREIGHTS.—It was decided that this subject should be taken up by our delegate. Two members also gave notice that they wished to see the delegate with regard to a Labour Department matter.

5. ELECTION OF PLANTING MEMBER.—Read letter from the Hon'ble Mr Barber dated 19th June and also copy of letter dated 25th June from Mr. Richardson to Mr. Barber since published in *'Planters' Chronicle* of 1st inst.

The Hon'ble E. F. Barber was elected unanimously.

6. 3RD QUARTERLY MEETING.—It was decided that this should be held at Ladrum Bungalow kindly offered by Mr. Winterbotham.

With a vote of thanks to the Chair, the meeting closed.

(Signed) W. A. J. MILNER,
Honorary Secretary.

Anamalai Planters' Association.

Proceedings of the Half-Yearly General Meeting of the Anamalai Planters' Association held at the Club on the 3rd July, 1916.

PRESENT.—Messrs. J. Hatton Robinson (Chairman), E. W. Simcock, J. A. R. Lloyd, J. E. Scott, B. M. Behr, S. Sladden, H. O. K. Walsh, R. Fowke, D. Cooper, J. H. I. Jones, E. N. House, J. E. Sampson, H. N. F. Walsh, J. H. Jeffrey and A. A. Robb (Honorary Secretary). Messrs. G. A. Marsh's, J. E. Carless's and the Amalgamated Tea Estates and the Anglo-American Direct Tea Trading Company's interests were represented by proxy.

1. Minutes of the previous Meeting were read and confirmed. The Chairman pointed out that Messrs. House and Cotton's names were omitted as having been present at the previous Meeting, and the Honorary Secretary was instructed to add their names to those members present at the Meeting held on the 15th May, 1916.

2. DELEGATE FOR THE U. P. A. S. I. ANNUAL GENERAL MEETING AT BANGALORE.—Mr. J. Hatton Robinson was elected to represent the Association, and, in the event of his being unable to go, Mr. Cotton was elected to attend. The sum of Rs. 200 was voted towards the Delegate's expenses. The U. P. A. S. I., agenda was then discussed.

3. ELECTION OF PLANTING MEMBER.—On the voting papers being examined, it was found that Mr. E. F. Barber was unanimously elected to represent the Planting Community on the Madras Legislative Council.

4. MEDICAL AFFAIRS.—A letter from the District Medical and Sanitary Officer in reference to the new Sub-Assistant Surgeon was read and recorded. There was much discussion with regard to the unsatisfactory medical arrangements in the District at present, and the following resolution proposed by Mr. B. M. Behr and seconded by Mr. E. W. S. Simcock was passed unanimously: "That the members of this Association not being satisfied with the Government Medical Scheme in this District ask the Local Fund Board that the New Government Medical building be handed over to the Association with a contribution from the Local Fund Board."

5. POST AND TELEGRAPHS.—The Honorary Secretary was requested to write to the Superintendent of Post Offices, Nilgiri Division, and point out that the Packer mentioned in his letter No. 3078 of 21st May 1916 has not been at the Valparai P. O. for over a month, and ask what steps have been taken to replace him.

6. ROADS.—Read and recorded letter from the Executive Engineer, D. P. W. in reference to grants for the various District Roads. The Delegate to Bangalore was requested to bring this question up at the Meeting of the U. P. A. S. I. The Honorary Secretary was requested to write to the Hon'ble Mr. Barber in reference to the condition of the District roads.

7. WESTERN OUTLET.—The Honorary Secretary was instructed to write to the Dewan of Cochin and inform him that all but three interests are now ready to sign agreements.

8. POLICE.—The Honorary Secretary was asked to write to the District Superintendent of Police and enquire if the local Police can take up cases in the District. It was recorded that it took 10½ days for the Kottur Police to attend to a case in the District.

9. GHAUT CHATTRAMS.—A resolution proposed by Mr. Scott and seconded by Mr. Robb was carried unanimously "That the Honorary Secretary be requested to ask the Government to make this Association a grant of Rs.1,000 to build two Chattrams on the ghaut as shelters for coolies on their way into, and out of, the District, and that this Association will build those Chattrams for Government.

10. BOYN'S ADVANCES.—Proposed by Mr. Robb and seconded by Mr. Scott "That from 1st August next Boyn's advances be limited to Rs. 2 per head for all works other than weeding."—Carried by 504 votes.

11. ASSOCIATION RULES.—The Rules, as revised by the Sub-Committee appointed at the previous General Meeting, were read.

12. FINANCE.—A statement of accounts of the Association for the half year was read by the Honorary Secretary.

13. ELECTION OF COMMITTEE.—Messrs. Behr, Simcock, Cotton, Fowke and Scott together with the Chairman and the Honorary Secretary were elected.

14. NEW MEMBERS.—Mr. E. Hardy (proposed by Mr. Robb and seconded by Mr. Behr) and Mr. L. C. Turner (proposed by Mr. Robinson and seconded by Mr. Sladden) were unanimously elected as members of this Association.

The Meeting terminated with a vote of thanks to the Chair.

(Signed) J. HATTON ROBINSON,
Chairman.
(,,) ARTHUR A. ROBB,
Honorary Secretary.

Wynaad Planters' Association.

Proceedings of a General Meeting held at Meppadi Club on July 5th, 1916.

PRESENT.—Messrs. Blackham, Gillatt, Macleod, Malcolm, Stewart, and Abbott Honorary Secretary.

Mr. Macleod in the Chair.

2243. THE PROCEEDINGS OF THE LAST MEETING.—These were confirmed.

2244. COCA IN WYNAAD.—Read correspondence between Messrs. Peirce, Leslie & Co., and the Assistant Commissioner Salt and Abkari. The Honorary Secretary said he had informed the Assistant Commissioner, Mr. Rendle, of the resolution passed at the last Meeting (para. 2836).

2245. CLOSING MAILS AT MEPPADI.—Read letter from Honorary Secretary and reply from Postmaster General, informing him that the Superintendent of Post offices had asked for sanction for the employment of an additional runner to enable him to effect the proposed change. The matter is under correspondence.—Noted.

2246. TELEGRAPHS—SULTANS BATTERY OFFICE.—Read letter from the Honorary Secretary enquiring when this office is to be opened for traffic, the wires having been in position for several months, and reply from the P. M. G. (Telegraphs) stating that steps are being taken to obtain the Director General's sanction as soon as possible.—Noted.

CHERANBADI-MEPPADI CONNECTION.—Read letter from Honorary Secretary asking to have this restored.

2247. ELECTION OF PLANTING MEMBER.—Read letter from the Hon'ble Mr. Barber to the Chairman, Nilgiri Planters' Association which he asked to have read at this Meeting. The Honorary Secretary said he thought there ought to be a change made in the method of election. The present system led to a good deal of confusion and to votes being given to men who had no intention of standing for election. If there had been printed balloting papers the result last month would have been different. For one thing those members who were kind enough to vote for himself as Member of Council would not have done so. It was desirable that District Associations should have the opportunity of voting for any candidate they preferred. He did not believe that this object would be attained by insisting on candidates being nominated at the Bangalore

Meeting, as was now proposed by one Association, a year before the election. Even if that proposal met with general acceptance the rules would have to be altered. After some discussion it was resolved to instruct the Delegates to the Bangalore Meeting to propose that in future every District Association be asked to nominate any candidate it wished two months before the date of the election, that only such candidates be eligible and that the Secretary U. P. A. S. I. issue printed ballotting papers with the names on them.

2248. BANGALORE MEETING.—It was resolved that the Honorary Secretary is to vote for the Association. The Delegates were instructed to urge with reference to *the Export Duty on Tea* that a countervailing duty be imposed on all tea imported into the United Kingdom.

2249. BOX LININGS.—Letter from the Secretary, U. P. A. S. I. with samples of tea box linings sent by the South India Export Co. Noted.

2250. ATTESTING CONTRACTS IN MYSORE.—It was stated that Postmasters who have been appointed in various places in Mysore to attest contracts under the Madras Planters' Labour Law, are not bound to perform this service. The Honorary Secretary to enquire for specific instances, and to address the Judicial Secretary, Madras Government.

2251. TIMBER TRAFFIC.—Read letter from Mr. Gillatt the Association's Representative on the District Board to the President on the subject of the damage done by this traffic in the Monsoon and danger to the public. Proposed by Mr. Malcolm and carried—That this Association agrees with Mr. Gillatt's letter. That there is great damage being done to the Ghaut by the transport of heavy logs during the wet weather, owing to the effect of the wheels at the corners due to the leverage. Also that there is great danger to the public in sliding these logs down the hill side, especially to those travelling in slow moving vehicles, which have great difficulty in evading them. We think that numbering and registering all carts would assist in controlling this traffic.

A vote of thanks to the Chair terminated the Proceedings.

(Signed) D. H. MACLEOD,
Chairman.
(„) C. E. ABBOTT,
Honorary Secretary.

SOUTH INDIA PLANTERS' WAR FUND.

	Rs.	A.	P.
Amount previously acknowledged	45,539	12	8
Proceeds of a Concert and Dance given by Mr. W. G. F. Walters, Superintendent of the U. P. A. S. I., Labour Department, at the Government Reformatory, Chingleput ...	20	0	0
Total...	45,559	12	8

OVERSEAS AIR CRAFT FUND.

Balance	95	0	0

MARKETS, PRICES, AND STATISTICS.

Coffee.

Brazil receipts to 24th June :—

1916.	1915.	1914.	4913.
14,818,000	19,698,000	13,709,000	11,376,000

Offerings at auction have been :—

——	20—23 June.	Since 1st Jan.	Last year.
East Indian ...	109	24,913	26,113
Costa Rica ...	2,197	79,939	77,919
Other Milds ...	855	54,919	110,338
Brazil ...	4,497	54,054	90,639
Robusta ...	265	1,041	11,989
B. E. A. & Uganda ...	22	7,345	9,629

The Coffee market remains very quiet, but prices are steady. The 100.000 bags of Valorisation stock were absorbed at once and had no effect on the Havre market ; the quantity was tendered for about four times over. The newspaper report of a reduction in the duty appears to have been due to a misunderstanding, no charge has been made.

Tea.

The market was again lower. The sales on 26th June showed a further decline of about $\frac{1}{4}d$.

The following prices were obtained for South Indian teas :—

—	B.O.P.	B. P.	Pek.	O. P.	P. S.	B.P.S.
TRAVANCORE.						
Pambanar	...	11¼	...	...	...	...
Sevenmally	...	11¾	11¾	1/-¾	10¾	...
Fairfield	10¾	10¾	10¼	...	...	...
Bon Ami	11½	10¼	10¼	...	...	...
Nullatanni	...	...	11	1/-¾	...	...
Wallardie	11¼	11	10½*	...	9¾*	...
Kolie Kanum	11½	10¾	10½	...	10	...
Chokanad	...	1/-	11¼	...	...	...
Vagaimunai	...	...	11½	1/1¼	11	...
Stagbrook	11¼	11	11¾	...	...	...
NILGIRIS.		10½				
Cherakara	...		...	...	...	...
New Hope	10¾*	...	10¾	11	10¼	...
Mayfield	10¾*	...	10¾*	11½*	...	...
Prospect	1/-½	1/-¼	11½	1/1	...	...
Davera Shola	11¾	...	...	...	...	...
WYNAAD.						
Chulika	10¼	10¼	...	...	...	9¾
ANAMALLAIS.						
Stanmore	11½	...	10¾	...	10¼	...
	11½	...	10¾	...	10	...

* Withdrawn from sale.

Statistics.

South Indian Rubber Companies.

	Mundakayam Valley Rubber Co., Limited.		Teekoy Rubber Estate, Ltd.	Malayalam Rubber and Produce Co., Ltd.	Central Travancore Rubber Co., Ltd.	Pudukad Rubber Co., Ltd.
	Kutikul.	Vaila-mullay.				
Acreage, Rubber...	...	...	...	8,427	...	...
Rubber & Tea...	...	...	...	714	...	...
Acreage tapped ...	...	...	...	4,395*	1,041	653
Crop 1915 ...	183,910	13,565	165,056	725,685	185,396	123,481
Yield per acre ...	204		...	165	177	189
Yield per tree ...	1·56		...	...	...	1·5
Trees per acre ...	116		...	...	110	...
Cost Production, f.o.b. ...	1/1·86		1/1·75	...	...	...
all in ...	1/4·74		1/5	1/4·88	1/7	...
Average price realised per lb...	2/8·28	2/4·76	2/9·75	2/9·32	...	...
Crop estimated 1916 ...	...	...	205,000	...	240,000	...

* 885 acres tapped for the first time.

South Indian Tea Companies.

	East Indian Tea and Produce Co., Ltd.	Malayalam Tea and Produce Co., Ltd.
Acreage	4,783	2,412
Crop 1915	2,57,000	1,429,500
Yield per acre	555	592
Cost of production all in ...	7·49*d.*	8·31*d.*
Average price per lb., realised ...	10·63*d.*	10·92*d.*
Crop estimate, 1916	2,656,500	1,610,650

The following figures are extracted from the *Annual Report of the Uganda Agricultural Department*:—

1915.	Native Cultivation.	European Cultivation,
Coffee	8,692 ac.	...
Under two years old ...	... ...	3,825 ac.
Over two years old ...	... ...	5,726 ac.
Robusta	... ...	367 ac.
Rubber	3,345 ac. ...	1,638 ac.
Rubber and Coffee... ...	... ...	4,835 ac.
Ceara Rubber	... ...	672 ac,

Exports in 1915.

Coffee in husk	3,103 cwts.
Coffee in parchment ...	18,998 cwts.
Rubber	22,056 lbs.

R. D. A.

MECHANICAL DRYING OF COFFEE ON THE ESTATE.

By W. H. Reed Esq., and R. D. Anstead Esq., m.a., Deputy Director of Agriculture, Planting Districts.

In 1913 one of Messrs. W. McKinnon & Co's. Coffee Dryers was installed at Mavinkere Estate, Kalasa, Mysore and it was used to dry part of the 1914-15 crop. The machine was then not working quite properly and the trials made were purely experimental. The 1915-16 crop was almost entirely handled in the machine and the results obtained may interest Coffee Planters' in Southern India.

The machine installed is an Okrassa Improved Patent Dryer, Size I, the drying cylinder being eight feet in diameter and 3 feet long, and it cost £205 plus freight and insurance. Its capacity is 113 cubic feet and it requires four horse power to run. The size of the building required to house the dryer is 26 x 16 feet, the height of the room with loft being 12 feet. At Mavinkere it is run with other machinery the length of the main shaft being 30 feet and diameter 2½ inches, the countershaft for the fan being 5½ feet long diameter 2 inches. The average oil consumption is ¾ gallon per hour.

The advantages which Messrs. McKinnon & Co., claim for this machine, have all been realised in practice, *viz*, that it can hold a large charge of Coffee at one time; the hot air current is continuous and penetrative and not irregular in action; it can be charged completely at one operation from the loft above; its construction is simple and weight small.

Hot air at a known temperature, which can be regulated and controlled by means of a thermometer, is driven from a furnace burning wood by means of a fan into the cylinder containing the Coffee. This cylinder rotates on its axis and as it does so the hot air is blown from the central shaft, which is perforated, through the coffee. The cylinder is constructed in two chambers and as it rotates coffee falls in a stream from one into the other being made, by means of baffles, to spread out so that the hot air blows through the mass of moving coffee, thus subjecting each individual bean to the same amount of drying. The moist air passes out of the cylinder continuously through perforated plates in its sides. It was found in practice that the best temperature at which to keep the hot air was seventy five to eighty degrees.

The machine has been found very satisfactory. As compared with the usual method of sundrying it saves the drying ground space and three coolies a day. Invariably during the picking season there is a week or ten days of wet or cloudy weather which hinders and delays sun drying. With the Dryer one is absolutely independent and can go on curing without any delay. *A ton of Coffee can be picked, pulped, washed, dried, and despatched in four days.* The usual procedure was to give the Coffee from the washing vats a preliminary air drying of two days and then to finish it off in the dryer.

The colour of the coffee dried in the machine is even and there is a great difference in out-turn compared to sun drying. The Coffee has been sold privately for the last two seasons so that no brokers reports are available; but the great advantage to be obtained from the use of a Dryer is the improvement in the colour and the out-turn.

There are two ways of considering the advantages which may accrue from the installation of a Coffee Dryer on an estate. The first is to look on it as a labour saving device: This point of view has been dealt with above by one of us.

Another point of view is to consider the effect it may have on the actual improvement of the quality of the cured coffee. In all investigations which have been made into the question of Coffee curing and the quality of Mysore Coffee which is said, rightly or wrongly, to be gradually deteriorating, one point stands out prominently, and that is the importance of even drying. The late Mr. Graham Anderson C. I. E. said, "unevenly dried parchment is one of the greatest misfortunes, as a uniform condition can never be obtained after bulking has been carried out and consequently before milling can take place some of the coffee will be greatly over dried and a proportion of the lot will be crushed, or rendered pale, by the weight of the roller."

E. W. R. writing on the subject of Coffee curing in the *Planters' Chronicle* (*V. p.* 605.) gives the advice, "dry as evenly as possible. By evenness is meant, get each bean as near the same state of dryness as possible. The great thing in order to get the best results with an Edge Runner is an even and thorough drying, and an unevenly dried coffee turns paler than any other during peeling. One has only to see a big consignment arrive on the coast, classified as dry at average weights of say 31 lbs; if women were put on to pick over a certain portion one would find they could get bushels at 33 and 29 lbs odd, though the average would still be 31 lbs. This is what Curers mean by uneven drying."

It is almost impossible to get coffee really evenly dry in the sun under estate conditions, especially if there is a big crop. To do so the coffee must be spread very thinly and evenly on the drying tables and constantly turned over, and this implies not only a lot of labour, but a lot of space and much bigger drying tables than most estates possess.

When the coffee is dried by hot air in a machine evenness of drying is much more likely to be obtained since each bean is subjected to the same conditions as every other bean. To test whether this was really so a number of samples from the machine dried coffee were examined. The plan adopted was to pick out at haphazard from each sample (Nos. 7 to 20) three lots, each consisting of 15 sound beans. These were separately ground to a powder and dried in a water oven at 100 C in the laboratory till they ceased to lose weight, and the loss in weight was then calculated in each case to percentage of moisture content. It was argued that if the samples were evenly dried all the lots picked out in this way would contain the same percentage of moisture as far as each individual sample from which they were chosen was concerned, while if unevenly dried the percentage of moisture contained in these lots would differ.

When the method was tried on a sample of sun dried coffee the following percentages of moisture were obtained for five different lots each consisting of 10 beans chosen at haphazard from the same sample of coffee.

1.	.....	10·40%
2.	.....	10·87%
3.	.....	11·18%
4.	.....	12·00%
5.	.....	12·38%

These lots show a range of moisture of 1·98% and emphasize the uneven drying complained of above.

The results obtained with the machine dried coffee are very different and are set out in the last two columns of Table I. Here it will be seen that the greatest range of moisture content between the beans in any one

lot is only 0·16%. Thus evenness of drying has been obtained and this should have an effect on the quality of the finally cured coffee which again should be reflected in its price.

TABLE I.

MACHINE DRIED COFFEE.

No of Sample.	Date Jan. 1916.	Weight of Wet bushel. lbs.	No. of days in the sun.	No. of hours in the drier.	Weight of dry bushel lbs.	Percentage of moisture in the samples.	Range of Moisture vari-ation.
7	1	42	4	19	32½	6·86 6·98 7·01	0·15
8	2	42	4	21	31¼	6·98 7·08 7·08	0·10
9	3	40½	4	15	31½	7·06 7·05 7·07	0·02
10	4	46½	3	23	32¾	7·11 7·23 7·17	0·12
11	5	46½	3	23	32¾	6·93 6·96 7·02	0·09
12	6	42¾	3	19½	32	7·58 7·55 7·60	0·02
13	7	40	3	15	32½	6·76 6·86 6·84	0·10
14	8	40	3	14½	32¾	6·69 6·95 6·89	0·07
15	9	41	3	15½	34½	7·23 7·38 7·29	0·15
16	10	44	3	16½	33½	7·42 7·39 7·34	0·08
17	11	42	3	22	33	7·37 7·49 7·49	0·12
18	12	42	3	22	33	6·89 6·83 6·84	0·06
19	13	44	2	21	33	6·55 6·48 6·51	0·07
20	14	45	2	17½	29¾	5·84 5·68 5·81	0·16

CORRESPONDENCE.

THE EDITOR,

Planters' Chronicle,

Bangalore.

Spraying for Leaf Disease.

Dear Sir,—Neither Mr. Martin nor Mr. Danvers in their letters on L. D. and B. R. has taken into consideration that the chief cause of B. R. is the C. P. (close planting). Most of the coffee estates are planted 6 x 6 or some of the old ones even as close as 5½ by 5½, no air or light gets to the coffee in the middle of the fields, and very little wind either. Coffee planted 6' by 6' in fairly good land not only touches, but in many cases one tree overlaps another, and the root space is not enough, one tree's roots going right across another's. 7' by 7' is far better and in good soil even more. In the present system of 6 by 6 the trees only bear on the top branches and nothing on the lower primaries, which in many cases have gone altogether. In wide planted coffee the trees bear right down to the ground and are far healthier as they have more root space and air and light, the C. P. has a lot to do with the B. R. if not also the L. D.

I do not think weeds have anything to do with the L. D. as in thick coffee there are very few weeds at all. I do not of course know what district Mr. Rogers was thinking of when he wrote his letter; but in Mysore all jungle shade is cut down before a clearing is planted and the shade is planted with the Coffee; this is usually done in all new clearings.

As to clean digging in July and August as a cure for either L. D. or B. R. the remedy would be worse than the diseases except that in a few years there would be no coffee to cure as of course the surface soil would be gone.

Your faithfully,

MALNAAD.

Fairlands, Sidapur,

July 16th, 1916.

THE EDITOR,

Planters' Chronicle.

Bangalore.

Spraying for Leaf Disease.

Dear Sir,—With regard to spraying for leaf disease, can our Scientific Officer or any one with experience tell us if any experiments have been tried of combining a Borer deterrent with Bordeaux Mixture when spraying the stems and ground? Jay's fluid has been used with very good results as a borer deterrent by a Coorg Planter, the application of a mixture of this for 2 consecutive seasons having given immunity from attack for a number of years.

Possibilities are opened up, where there are water and other facilities, if liquid manures and one or other or both deterrent could be combined, without destroying their efficacy.

Yours faithfully,

PERCY G. TIPPING,

Fairlands, Sidapur, July 16th, 1916.

THE EDITOR,

Planters' Chronicle,

Bangalore.

Spraying for Leaf Disease and Scientific Experiments

Dear Sir.—With you we rejoice that one of the results of the Coffee planters' gathering has been to induce some few brother planters to emerge from their "dug-outs" armed with pens to give us the benefit of their experiences. this also is another step in the right direction, for have we not in our early youth learnt that "Experientia doesit" (Latin)!

Of course the best way of gaining sound knowledge is by going about and seeing things for oneself, when a clearer estimate of results, based on the local conditions, can be acquired, but as most planters are pretty well tied down, by the force of circumstances, an occasional meeting, like the one held in June, apart from the Scientific part of the proceedings, which were both interesting and instructive, brings about an interchange of experiences and ideas and much useful discussion, to say nothing of ensuing correspondence.

I am not in agreement with Mr. Rogers, when he says, that the "late conference tackled the subjects from the wrong end." The subject in this instance was "Spraying as a preventative measure against Leaf Disease and Black Rot" and the discussion was to try and make it clear whether this was likely to prove a cheap and effective means of reducing the damage done by, and the possibility of killing out, the spores, and thus enable us to obtain better return in the near future, which is the point that most nearly concerns us. I am not questioning any other portion of Mr. Rogers' able letter, for it is universally admitted that a healthy and vigorous organism, be it animal or vegetable, is better able to resist, and if attacked to throw off disease, and it is to attain and maintain this desideratum that every planter worthy of the name is working, but, working be it remembered in the majority of cases, not with an unlimited capital, but with one eye on the Balance sheet, and the other wide open for any chance of cheaply and effectively combating any or every one of the ills that coffee is heir to, and living in hopes of better times in the near future. Is it not also common knowledge that when vast numbers of any species are crowded together diseases are bred and not easily checked, especially where separation and segregation are not possible. Doubtless the diseases start amongst the weaklings, who are naturally predisposed to contract it. Now if these attacks can be dealt with by simple and effective means at the outset, shall we not be much nearer our goal?

Mr. Frattini's experiments are most interesting and instructive, and should be followed up as recommended by the resolution passed at the Meeting, but Experiments without accurate and exact date lose much of their value. Most planters, however keen and interested they may be, have not the time for such work in the way it should be done, nor are they prepared to meet the outlay entailed in conducting strictly Scientific experiments. They are up against a commercial proposition and have to work their Estates as such, but we have in the present advantageous offer of the Government of Madras the means to our hand, and it is up to every planter, by every means in his power, to make the most this chance of establishing a permanent and well staffed Scientific Department, such as we could never hope to obtain by our own unaided efforts.

It may not be general knowledge that the Committee of the U.P.A.S.I., have advanced so far as to have met the monetary difficulties, and secured both a tea and a rubber plot, but they still need the promise of a suitable coffee plot. So far as Coorg is concerned several letters have gone home to absent proprietors, asking sanction for the necessary plots, and cable replies are expected. It is to be hoped that the replies will be favourable, and that in the meantime others will come forward, so that the committee appointed to deal with this matter may have a wide choice.

In apologising for the length of my letter I would urge the analogy between the spraying under discussion and an Experimental Station, for which planters themselves will settle the form of experiments they wish conducted, and Scientists will carry them out.

Yours faithfully,
PERCY G. TIPPING.

Att. 2/6th Gurkha Rifles,
Mesopotamia Expeditionary Force,
C/o Presidency Postmaster,
Bombay.
3—7—16.

THE EDITOR,
Planters' Chronicle.
Bangalore.

Sir,—With reference to my appeal a few months ago, through your columns, for tea I have very much pleasure in writing to inform you that two 5-lb. boxes of tea were received from Mr. J. Stewart of Venture Group, Kalthuritty P. O., Travancore and I would like to make it known through your columns how very grateful we all are to Mr. Stewart. The tea had a splendid flavour, and was so much appreciated by everyone. Mr. Stewart has very kindly promised to send another consignment, which I can assure you is much looked forward to in this thirsty part of the world.

Yours faithfully,
R. M. S. BARTON, 2nd Lieut.
Mess Secretary,
2/6th Gurkha Rifles.

The Planters' Chronicle.

RECOGNISED AS THE OFFICIAL ORGAN OF THE U. P. A. S. I., INCORPORATED.

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THE U. P. A. S. I.

(INCORPORATED.)

Contents.

We publish the Minutes of the Half-yearly Meeting of the South Travancore Planters' Association: also the Minutes of a Meeting of the Kadur and Hassan Motor Union.

R. D. A. Contributes an article on Bark Rot of Hevea, Insect Notes, a Comparison of the Brazilian and Plantation Methods of Preparing Para Rubber, and the Effect of Thinning out Rubber accompanied by a table which shows the increase.

R. D. A. also contributes his weekly article on Markets, Prices and Statistics.

Our correspondence includes a letter from Mr. R. G. Foster on Cultivation and Disease and "Ut veniant omnes" writes on the Labour Question.

The Mayo Hall has been engaged as usual for the Annual Meeting from the 14th proximo.

We have been informed that there will be a dance at West End Hotel on the 17th proximo.

The Bank of Madras notifies us that on and after the 12th July 1916 it will allow interest at the rate of 4½% per annum on new deposits for a period of 12 months.

SOUTH INDIA PLANTERS' WAR FUND.

	Rs.	A.	P.
Amount previously acknowledged	45,559	12	8
Mr. R. H. Crowther	10	0	0
Mr. D. V. Crowe	7	8	0
Mr. Percy Hunt	30	0	0
Messrs. Barber & Pascoe	75	0	0
Mr. W. A. Asher	200	0	0
Total...	45,882	4	8

OVERSEAS AIR CRAFT FUND.

Balance	95	0	0

DISTRICT PLANTERS' ASSOCIATIONS.

South Travancore Planters' Association.

Minutes of the half-yearly Meeting held at the Quilon Club, on 1st July, 1916.

PRESENT.—Messrs. J. B. Cook, (Chairman), D. G. Cameron, J. Stewart, L. G. Knight, C. Brander, H. S. K. Morrell, A. W. Upcher, R. J. Moore, H. O. Gray, T. L. Jackson, W. Stainforth, W. G. Thom, C. E. Lister, J. A. Gwynne, (Honorary Member), and *Visitor*.—Mr. J. Mackie.

Chairman:—Before proceeding with the business of the Meeting, I would like those present to pass a vote of regret and sympathy with the relations of Lieut. W. Hamish Chalmers, who was killed in Mesopotamia last April, also with the family of the late Mr. E. M. Ewart who died suddenly at Nagercoil. Passed in silence, all members standing.

THE NOTICE convening the meeting and minutes of last meeting were read and confirmed.

PESTS ACT.—The Bangalore Delegate was instructed to support this at the annual meeting of the U. P. A. S. I.

SCIENTIFIC OFFICER'S VISIT.—It was also decided that our delegate arrange dates with Mr. Anstead for visiting the different districts mentioned.

TIMBER VALUES.—Read copy of resolution from the Central Travancore Planters' Association also a letter from the Honorary Secretary of the Travancore Combined Planters' Association and this matter was fully discussed in committee.

RESIDENT DOCTOR FOR RANI VALLEY.—After some discussion, it was proposed by Mr. Morrell and seconded by Mr. Brander that the Honorary Secretary write and lay the matter before Government and ask if they are willing to allow any grant towards this scheme.—Carried.

CORRESPONDENCE.—Read circulars from Secretary, U. P. A. S. I., re-sale proceeds at the Madras Exhibition, and rates for tea seed by Passenger Train, etc.

There being no other business, the meeting closed with a vote of thanks to the Chair.

(Signed) J. B. COOK,
Chairman.

(,,) A. W. LESLIE,
Honorary Secretary.

Kadur and Hassan Motor Association.

Minutes of a meeting of Association held at Mudigere on the 8th of July 1916.

PRESENT.—Messrs. K. Krishna Iyer, H. Watson, F. I. Morgan, H. Allardice, K. V. Ananthraman, F. Hugonin, J. R. Hugonin, M. Houssain Sahib, M. Jois, D. Meppen, T. B. Mulla Gouden, R. Nanasamie Rao, S. C. S. Jones, F. Sorab, M. J. Woodbridge, A. Thomson (Hon. Sec.). *Visitors*.—C. H. Godfrey, Machiah, Dr. Krishna Moodliar, Mr. K. Krishna Iyer was elected to the Chair.

The minutes of the last meeting were confirmed.

R. A. C.—After the correspondence had been read and the matter discussed.

Proposed by Mr. H. Watson and seconded by Mr. Nanasamie Rao. "That this Association accepts the R. A. C. proposals and the Executive be empowered to execute the agreement with the R. A. C."—Carried.

"Resolved that the Honorary Secretary be requested to get full particulars from the R.A.C. about their Insurance rates."

Badges.—That this matter be held over pending a settlement with the R. A. C.

Roads.—That the attention of the Executive Engineer Kadur District be called to the state of the road between Kotigehar and the frontier.—Carried.

Proposed that the practice of the Executive Engineer of the Kadur District in allowing metal to be put down without being covered and consolidated is to be deprecated." Proposed by Mr. Meppen seconded by Mr. Jois.—Carried.

Proposed by Mr. Allardice and seconded by Mr. Hugonin. "That branches of the avenue trees overhanging the roads should be cut down, also that jungle growth and lantana at the sides of the roads, especially at the corners, should be cut back."—Carried.

Proposed by Mr. Jois seconded by Mr. Hugonin. That the Vice-President of the Chickmagalur Municipality be written to, pointing out that the roads in the Municipality have for some years past been bad for any traffic. especially motors, and this Association hopes that steps will be taken to remedy matters.—Carried.

"Resolved that the old method of having side drains is far more effective than the present system of having only one drain in the centre of the road. To be forwarded to Superintending Engineer Hassan Circle.

The Honorary Secretary was requested to draw the attention of the Kadur Executive Engineer to the scours on the Chickmagalur-Kadur road at Mile 141 about 30 yards on the Chickmagalur side of the Gowriehulla bridge, and again at the new well at Sakrapatna. These constitute a grave danger to traffic.

That the condition of the Hanbalu road be brought to the notice of the Deputy Commissioner, Hassan District.

Proposed by Mr. Nanasamie Rao and seconded by Mr. Woodbridge "That the Postal Authorities be requested to expedite the Mail service from Chickmagalur to Mudigere by substituting a motor for a tonga service."—Carried.

Correspondence.—Mr. A. C. Bonner's letter was read—Mr. E.W. Rutherord's letter about the condition of the Hassan—Arsikere road was read.

It was suggested that members should notify the Hon. Sec. of any bad bit of road, who, on receipt of this information would then notify all members, and also notify the Executive Engineer of the District concerned.

It was decided that the next meeting should be held at Hassan in the first half of September.

The meeting closed with a vote of thanks to the Chair.

(Signed) A. THOMSON,
Honorary Secretary.

BARK ROT OF HEVEA.

We have received a copy of a Bulletin on this subject compiled by Mr. I. F. Dastur, B. Sc., the First Assistant to the Imperial Mycologist, Pusa. (*Department of Agricultare, Burma. Bulletin No. 14 of 1916. "Black Thread Disease of Hevea in Burma."*) Black Thread Disease is what is commonly known in South India as "Bark Rot" and Mr. Dastur gives the following description of it which corresponds exactly with the disease as we know it on our estates. "The naked tissues laid bare by tapping become disfigured and damaged by the appearance of vertical slightly depressed black lines. These follow the tapping cut as it is continued down the stem and extend in through the cambium into the wood. The blackening of the tissues runs along the tapped area and eventually covers the whole cut. Diseased areas soon become vertically cracked especially under wet conditions. From the vertical cracks latex occasionally exudes. In some cases there is a thick wad of coagulated latex between the diseased renewing bark and the wood; in these cases the cambium is completely destroyed and there is always a bulging out of the diseased renewing bark. This soon decays leaving behind a big gaping wound exposing the wood, *i.e.*, a true "canker" is formed. It is the damage to the cambium which constitutes the most serious feature of the disease for it is upon the activity of this tissue that the tree depends for the smooth and even regeneration of the bark cut away during tapping."

It has now been proved by careful inoculation experiments with pure cultures that this disease is caused by the same fungus, a species of *Phytopthora*, which attacks the fruits and causes them to rot, and which Mr. McRae, the Government Mycologist, Madras Agricultural Department, believes to be the fungus which causes what is known as "Secondary Leaf-fall," a diseased condition of Hevea which would be better named "Abnormal Leaf-fall." (See *Planters' Chronicle Vol. X. p. 452*). Inoculation experiments on tapping cuts, renewing bark, and old bark showed that the fungus was capable of attacking the tree only through wounds. Inoculations made on uninjured parts of the stem and branches invariably failed whilst those on the wounded surface were successful.

The disease first makes its appearance soon after the rains set in and completely disappears after the close of the wet season. Even during the monsoon the progress of the disease is checked during a long break. The annual recurrence of the disease on the stem has not been found to originate from the infected areas of the previous year, but has been observed to be due to fresh infection. On an infected area the disease spreads downwards following the tapping cut; if tapping is stopped the spread of the disease is stopped. This is what would be expected from the discovery that the trouble is caused by a parasitic fungus. The fungus however lies dormant when tapping is stopped during the monsoon and resumes its activity when tapping is recommenced any time during the rainy period.

The fungus spreads most rapidly in wet weather and it is pointed out that closely planted trees which create a dark moist atmosphere favour the disease. This leads the author to suggest that one of the best methods of control is to thin out the trees so as to let in more light and air. The application of fungicides like Burgundy Mixture was a failure, though a 20% solution of Carbolinium plantarium is said to have been a success in Java. Cessation of tapping at the first appearance of the disease and the collection and destruction of all diseased fruits are recommended by the author as practical means of control. The latter is, however, a difficult procedure in estate practice and takes a lot of labour. It has been found in South India that a combination of cessation of tapping on attacked trees with the appli-

cation of a thin smear of a mixture of tar and tallow applied to the diseased spot has proved very effective. The mixture is applied with the finger and then rubbed with a small piece of gunny so as to get only a smear confined to the bark area attacked and its action appears to be two-fold. The tar acts as an antiseptic while the tallow forms a waterproof covering and thus deprives the fungus of the moisture so necessary for its growth and welfare. After the monsoon the treated areas gradually shed a thin scale of tar coated bark and expose a clean healthy surface beneath.

Covering the tapped surface with a mixture of cow-dung, clay, and sulphur has also been found beneficial ; the bark renews quickly and well beneath this covering and bark rot is reduced. The mixture may be best made by boiling one ounce of Sulphur in half a kerosine tin of water and adding equal parts of clay and cow-dung till a thick paste is obtained. If a little salt be added (an amount which Mrs. Beeton in her cookery book would call a " pinch.") it tends to keep the mixture moist and prevent it cracking after application. This mixture is chiefly applied in the dry weather and it prevents the tapped area drying out and promotes good bark renewal, and it also appears to have a beneficial effect as far as Bark Rot is concerned when the rains begin. In Ceylon the mixture is applied each month, within a quarter of an inch of the tapping cut, but in South India it is usually applied over the tapped area when tapping ceases, as it does in some districts, on account of the dry weather.

The Bulletin before us is a most valuable contribution to our knowledge of a disease which in some places annually does a large amount of damage and causes a considerable monetary loss due to loss of rubber.

According to the Reports of the Ceylon Committee of Agricultural Experiments, Mr. Bryce who has been working at this disease in Ceylon was inclined to attribute it to a physiological effect and not to fungus disease at all. Mr. Bryce failed to be able to inoculate trees with the disease and his theory was apparently that in wet weather the formation of the cork layer which protects the cells of the inner tissue and of the wood cambium was delayed. This causes cells to die locally and the decomposition products thus set free infiltrate into neighbouring cells and kill them. Mr. Dastur is to be congratulated that he has definitely proved this disease in Burma to be due to the presence of a fungus since the first real step towards the control of any plant disease is to discover to what it is due. The Bulletin should be in the hands of all Rubber planters. It is published in Rangoon at the Office of the Superintendent of the Government Printing, Burma and costs two annas only.

Insect Notes.

All the Provinces and some of the Native States now have Entomological Staffs, while some Entomological work is done by the Forest Department, the Indian Museum, and the Indian Tea Association. All these are continually making observations on the habits, life-histories, etc. of Indian insect life, but as a rule such observations are not easily accessible, especially to members of the Agricultural Department and of the planting community who do not often see the work published on Indian Insects unless it is in a more or less popular form.

Mr. T. Bainbrigge Fletcher, F. L. S., F. E. S., F. Z. S., the Imperial Entomologist has begun the publication of a series of Bulletins which will go far to make such information more available to the general reader who is often interested in insects, their names and life-histories. These Bulletins will contain short and often necessarily incomplete notes on the habits, life-history, food plants, etc. of Indian insects, and information regarding crop

pests and actual trials of remedial measures, in fact the sort of information which is usually buried away in note books, reports, files, etc, in contradistinction to the more lengthy and complete accounts for which the Memoirs, Bulletins, and Journals provide means of publication.

It is proposed to publish these Notes in Centuries. each note being numbered consecutively for convenience in subsequent citation. All this Mr. Fletcher tells us in the preface to the first of these Centuries now before us as *Bulletin No. 59 of the Agricultural Research Institute, Pusa,* entitled "*One Hundred Notes on Indian Insects.*" It can be obtained from the office of the Agricultural Adviser to the Government of India, Pusa, Bihar, or from Messrs. Higginbotham Ltd., or Messrs, Thompson & Co., Madras, price eight annas.

Among the notes of special interest to South Indian Planters we find the identification of the Cockchafer which in 1912 and 1913 did damage to coffee in Coorg and riddled the ground with holes, *viz., Holotrichia conferta, Shp.* It is the same beetle which appears at Ootacamund after the showers in April and May and it is figured in *South Indian Insects*, fig. 68, No. 9.

A Comparison of the Brazilian and Plantation Methods of Preparing Para Rubber.

A paper on this subject by G. S. Whitby appears in the *Journal of the Society of Chemist Industry* (*XXXV 9.*) Samples were prepared from the same lot of plantation latex, some according to the Brazilian smoke coagulation method and some as smoked sheet, and these samples were submitted to vulcanisation tests. The latex for the purpose was take, in the one series of experiments from fifteen year old treee thinned out to forty trees per acre. and in another series from five year old trees. To prepare a sample according to the Brazilian method it was smoked on a paddle in smoke from rubber wood and atap palm nuts. The latex was poured over the paddle, excess allowed to drain off, and the paddle then rotated in the smoke. When the latex had not sufficiently to allow of the paddle being held at rest without any latex falling off rotation was stopped but smoking continued long enough to give a firm product at the end of the day's operations, but not long enough to dry up any one layer. As soon as one layer was finished another was superimposed. Thus a spherical mass was finally obtained weighing ten pounds in one case.

To compare with this smoked sheet was made from some of the same latex each day. Two sheets were made on each occasion, one gallon of latex diluted to reduce its rubber content to 12·5% being used for each sheet, and this was coagulated with 0·5% of the weight of dry rubber of acetic acid in a 10% solution. The sheets thus made were allowed to hang in the air after rolling to drain for four hours and then smoked continuously for 22 days.

Vulcanisation tests were made in London nine months after the preparation of the samples according to Schidrowitz' method. The results obtained showed that the Brazilian method of preparing rubber by smoke coagulation is not superior to the plantation method of preparing it as smoked sheet, in fact the Brazilian method *per se* is probably somewhat inferior to the plantation method *per se.*

The results of this enquiry have also an incidental bearing on the question as to the effect of creping on quality. The mass of Brazilian rubber from old trees gave after creping results essentially similar to those given by samples from the same mass which were not creped but merely dried in a dessicator. It seems clear that the creping of the prepared rubber did not appreciably affect its quality. The effect of creping when applied to the fresh coagulum is of course another question.

The results obtained by Whitby lend no support to the widely accepted view that the latex from young trees is inferior to that from old trees. An examination of them makes it clear that samples of rubber prepared from latex from young trees may be as good as those prepared by exactly the same methods from the latex from old trees. In fact in the case of these particular experiments the rubber prepared from the latex of young trees proved superior to that from the latex of old trees, both when prepared as smoked sheet and by the Brazilian method.

The conclusion that there is no presumption that young trees as tapped in ordinary plantation procedure will yield poorer rubber than old trees is in full agreement with the general indication of all the vulcanisation tests which the author has made alone and in conjunction with Schidrowitz, and on various occasions rubber varying in age from four to seventeen years has been tested.

It is doubtful whether from the point of view of quality smoked sheet is strictly the best form of plantation rubber. As regards the general question of the relative quality of rubber in the two forms, sheet and crepe, it is probable that the general apprehension as to sheet being better than crepe is just; but as regards the question as to the relative value of smoking and air drying the indications of some recent experimental work is that the general apprehension to the effect that smoking improves quality is not justified.

A number of tests were also made in order to determine whether, in accord with the widely held views, prolongation of the smoking period beyond that necessary to dry the sheet had a beneficial effect on quality. Samples smoked until dry only (six days) and for various periods up to 47 days were examined, but no evidence was found that prolongation of smoking effected any improvement in quality.

The Effect of Thinning Out Rubber.

At a Meeting of the Ceylon Committee of Agricultural Experiments held on 11th May some figures were submitted showing the effects on the yield of thinning out fifteen acres of old rubber. These figures are of considerable interest and show very plainly that profitable results rapidly follow the thinning out process. The figures are those in the table below to which we have taken the liberty of adding the two columns which the yield per tree and how it decreases till thinning out is done and then enormously increases.

Season.	Crop.	Yield per acre.	Trees.	Trees per acre.	Yield per tree.	Increase.	Rainfall.
1907—08	4,003	267	2,419	161	1·658	—	145·41
1908—09	4,020	268	2,419	161	1·664	0·006	168·49
1909—10	5,146	343	2,419	161	2·124	0·460	137·65
1910—11	6,594	439	2,419	161	2·726	0·602	142·64
1911—12	6,425	428	2,419	161	2·652	0·074	167·02
1912—13	6,532	435	2,419	161	2·702	0·050	161·41
1913—14	6,001	400	2,180	145	2·759	0·057	196·84
1914—15	6,596	439	1,604	106	4·141	1·382	134·97

R. D. A.

MARKETS, PRICES, AND STATISTICS.

Coffee.

The following are the receipts from Brazil to 30th June, being the total crop:—

1916.	1915.	1914.
14,994,000	12,846,000	13,816,000

Offerings at auction have been:—

——	27—30 June.	Since 1st Jan.	Last year.
East Indian ...	806	25,719	30,900
Costa Rica ...	3,041	82,980	82,395
Other Milds ...	244	55,163	115,505
Brazil ...	2,325	56,379	94,543
Robusta ...	Nil.	1,041	11,989
B. E. A. & Uganda ...	15	7,369	9,795

The following prices have been obtained for South Indian coffee:—

—	No. 1.		No. 2.		No. 3.		PB.		T.		Extra.	
COORG.												
Matheson's Ceylon	45	76/-	35	74/6	...	...	...	...	...	...	...	...
,, Mocha	10	N.	11	N.	...	...	...	...	...	...	...	...
Cowerie Betta ..	13	74/-	18	72/-	...	...	...	...	...	...	...	...
	85	77/-	88	73/-	...	...	...	...	...	...	...	...
Pollibetta ...	33	77/-	35	73/-	...	...	...	...	...	...	...	...
	36	N.	32	N.	...	...	...	...	...	...	...	...
	31	N.	25	73/-	...	...	...	...	...	...	...	...
NILGIRIS.												
Glenvans ...	16	N.	29	N.	8	70/-	2	N.	12	70/6	11	N.
Suffolk ...	10	71/-	12	69/6	1	64/-	...	...	...	...	2	76/-
Hope ...	9	73/6	10	70/6	...	...	...	...	...	...	..	...
Gudalur Mullay ...	6	73/6	7	71/-	...	...	...	...	...	...	...	...

The market remains very quiet, but the small business passing shows steady prices. "Futures" have recently been very dull. Arrivals of new crop have swollen the figures of Brazil receipts and stocks and shipping restrictions have checked business. The prices for "current month" fell from 51/6 in the third week of May to about 45/6 in the end of June, but there has since been a slight recovery. Reports about the new Brazil crop are conflicting, estimates from some very reliable sources are considerably lower than the figures recently published. At a meeting held last week it

was resolved, "That it is in the interests of the Coffee Trade of London that the members of the trade form themselves into an Association," and a provisional Committee was appointed to deal with the matter. The objects of the proposed Association would be to "promote the best interests of the Coffee Trade as a whole for the mutual benefit of all concerned, Producers, Importers, Brokers, Dealers, and Consumers in general."

Tea.

The following amounts of Tea were shipped from the Madras Presidency in June:—

	lbs.
To United Kingdom	599,718
„ Ceylon	456,926
„ Canada	175,153
„ Queensland	25
„ America	206,146
Total...	1,437.968

Tea Prices in Calcutta on 11th July.

	1916.		1915.	
	as.	p.	as.	p.
Lowest leaf ...	6	9	10	3
Even leaf pokoe souchong ...	7	3	10	6
Lowest broken ...	7	3	10	3
Common broken ...	7	9	10	9
Low pekoes ...	7	3	11	0

The demand is still very slow but during the last few days about 6th July it was steadier and slightly firmer.

The following prices have been obtained for South Indian Tea.

—	B.O.P.	O. P.	Pek.	B. P.	P. S.	Fgs.	P. F.
Travancore.							
Gundamullay ...	...	1/-¾	...	...	...	11¼	...
Vagarriwai ...	...	1/-¾	11	11½	...	...	...
Munaar ...	...	1/-¾	11½	1/-¼	11¼	...	...
Sevenmullay ...	1/-½	1/-¾	11	11¾	...	...	...
Chokanad ...	...	1/-¾	11¼	11¾	10¾	11	10¾
Perriavurrai ...	1/-	1/-¾	11	11½	10¾	...	11½
Letchmi ...	...	1/-	10¾	11¾	...	...	11½
Devicolam ...	1/-½	1/1	...	...	10¾	...	...
Nilgiris.							
Nonsuch ...	11¾	11	10¾	...	...	...	...
Touramulla ...	...	...	10	...	...	...	...
Wynaad.							
Auda Tode ...	10¼	10¼	9½	10	9¼	...	...

Rubber.

The following are the figures for the Imports of Rubber into the United Kingdom.

	May.			Five Months ended May.		
From	1916.	1915.	1914.*	1916.	1915.	1914.*
Straits Settlements and Federated Malay States ...	2,945	3,157	2,106	16,450	20,316	12,659
Ceylon ...	564	666	481	4,130	7,280	3,136
British India ...	125	44	—	888	736	—
Dutch East Indies ...	497	257	—	1,487	970	—
Brazil and Peru ...	1,078	1,906	1,423	5,889	7,004	8,054
Africa ...	409	217	50	2,469	1,365	360
Other Countries ...	235	134	1,180	601	774	6,931
Total Tons ...	5,853	6,381	5,240	31.914	38,445	31,140

EXPORTS of all kinds of Rubber from the United Kingdom.

	May.			Five Months ended May.		
To	1916.	1915.	1914.	1916.	1915.	1914.*
Russia ...	586	2,371	903	2,630	4,572	3,473
Germany ...	—	—	1,166	—	—	4,511
Belgium ...	—	—	169	—	—	1,011
France ...	489	733	708	3,427	2.811	2,915
United States ...	3,705	4,001	2,709	12,208	18,688	11,091
Other Countries ...	805	763	294	3,701	3,626	1,721
Total Tons...	5.585	7,868	5,949	21,966	29,697	24,722

Federated Malay States Rubber Exports.

An official cablegram from Kuala Lumpur states that 3,956 tons of plantation rubber were exported from the Federated Malay States in the month of May as against 3,904 tons in April and 2,708 tons in the corresponding month last year. The total export for five months of the current year amocnted to 21,967 tons, compared with 15,787 tons in 1915 and 11,544 tons in 1914.

Appended are the comparative statistics :—

	1914. Tons.	1915. Tons.	1916. Tons.
January	2,542	3,473	4,471
February	2,364	3,411	5,207
March	2,418	3,418	4,429
April	2,151	2,777	3,904
May	2,069	2,708	3,956
Total...	11.544	15,787	21,967

R. D. A.

CORRESPONDENCE

Cultivation and Disease.

Dear Sir,—Mr. Lake's letter and those appearing in your subsequent issues are all of great interest to coffee planters and it is to be hoped that more will appear for they are both interesting and instructive.

Thinking my experiences of the last few years may be of interest to some of your readers I venture to give them.

Some fourteen years ago this Estate tried to do away with advances for labour with the result that owing to shortness of coolies, pruning and handling in the old coffee was allowed to slide, and very little cultivation was done at all. As the result of trees being only suckered three bumper crops were picked in succession (1903-1906).

Leaf disease in these years was bad and was put down to the heavy crops. Succeeding years only yielded -/8/- crops, and the leaf disease became worse, and an all the year round complaint with virulent late attacks from November-March which put trees clean out of heart.

One portion of the estate which had not been cultivated for a period of nine years was badly infected with root rot which notwithstanding check drains and non-digging was spreading.

In 1908 I started on a scheme of Frightfulness against this block which horrified some of my brother planters. In March I put a gang on with cutties to stump a field, every tree being cut above its bottom primary if present, or at a height not exceeding two feet. After this had been done the whole of the shade was knocked down and cut up.

In June a small gang went over the place suckering, leaving three suckers to each stump and from as low as possible, the reason for leaving three being that they, by the contact of their primaries, supported one another and were less liable to suffer from wind during the monsoon.

The whole piece was planted up 10 x 10 with silver oaks which were pitted for, and 20 x 20 with Erythrina stumps.

In September suckers were reduced to one per stump, preference being given to the lowest and strongest.

This was followed by a deep mamotie dig and the cutting of a trench 3 feet deep round all the old shade tree stumps.

In the following March this piece then being one year old had an application of 3 tons of lime per acre which was chopped in.

This system which has been going on steadily ever since has fully justified the money spent on it, and I now have some very fine fields of young coffee in place of the wizened hide-bound results of non-cultivation.

The cut down fields have had cultivation every year as also manure.

Leaf disease they had not escaped from, but it has been of the mildest type and done a minimum of harm.

One field under the lee of a ridge which used to be eaten up with black rot is now practically free.

The exposure to the sun, the liming, eradication of old shade, and cultivation have had a sweetening effect on the soil, and judging by the health and vigour of the trees I should say that root rot has had a pretty considerable check.

With an increased labour supply, systematic cultivation of the whole estate has been going on with the result that during the last three years the attacks of Leaf disease have not been as severe as previously, and the old trees, though shapeless and mostly gormandizers, have improved enormously and are this year giving a large crop.

Should any one be sufficiently interested in this cutting down system I shall be very pleased to show them the results.

Yours faithfully,

R. GUY FOSTER.

22nd July, 1916.

THE EDITOR,

The Planters' Chronicle.

The Labour Question

Dear Sir,—Are you by any chance a fisherman as I should like your advice? The Coffee Bug seems most effective in the Mysore Streams, and I wonder if you could recommend a bait that would raise these most illusive gentlemen in the mountain streams of the South. I am "fed up" with always getting my bait taken away by "Toby," and as I prefer to fish on a dull evening instead of before morning muster, I would like your advice, otherwise I will require to give up a pleasant pastime.

I am well aware of the weak points in my scheme, which I only brought forward as an alternative, as the reduction of advances to Rs. 12 does not seem to be working in spite of the fact that there is more combination than we had two years ago, but it is not taking effect as it should do, as we are trying to reach our goal by circuitous routes while our Kanganies are taking "short cuts" to theirs.

My sympathies are all with Ramasamy (not the Kangany) and in my regard for him I lost sight of the fact that such a thing as "earnest money" was required, but on second thoughts I believe it sometimes is.

As the Annual Meetings draw nigh I would commend to Mr. Martin's perusal the 2nd verse of the 13th chapter of the 2nd Book of Proverbs (Circular 2) where he will find written these wise words of that modern Sage, Upasi. "There are three degrees of falsehood, 1st Lies, 2nd Damned Lies, 3rd Statistics" I would ask Mr. Martin to take the Planting Public into his confidence and tell us exactly how things stand as there are still three years for us to repent.

Whatever scheme is finally adopted surely it is possible for us to have one that will stop our Kanganies from cheating both ourselves and our coolies as they are doing at present, and by so doing put a stop to our bad advances.

I have the feeling, Sir, that the present Labour Committee of the U. P. A. S. I. are really only Trustees and are too busy men to go into details. Would it not then be better to have a Conference on Labour which I am sure Mr. Martin will agree with me is a much more interesting subject for debate than Bugs.

Yours faithfully,

"UT VENIANT OMNES."

The Planters' Chronicle.

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THE U. P. A. S. I.

(INCORPORATED.)

Contents.

We publish the commencement of an article on Soil Denudation.

R. D. A. furnishes us with an article on Markets, Prices, and Statistics.

As promised in our issue of last week we publish the names of those who are attending the Annual Meeting as Delegates.

List of Delegates

Attending the Annual Meeting on August 14th, 1916.

Anamalai P. A.	...MR. J. HATTON ROBINSON *or* MR. COTTON.
Bababudin P. A.	...MESSRS. L. E. KIRWAN & S. H. DENNIS.
Central Travancore P. A.	...MR. W. H. G. LEAHY.
Coorg P. A,	...MESSRS. P. G. TIPPING & A. H. JACKSON.
Kanan Devan P. A.	...MESSRS. E. A. HUGHES & H. L. PINCHES.
Mundakayam P. A.	...MR. S. P. EATON.
Nilgiri P. A.	...MESSRS. J. S. NICHOLLS & A. S. DANDISON.
North Mysore P. A.	...MR. W. H. REED.
Shevaroy P. A.	...MR. E. TRAVERS-DRAPES.
South Mysore P. A.	...MR. C. LAKE.
South Travancore P. A.	...MESSRS. A. W. LESLIE & J. B. COOK.
Wynaad P. A.	...MESSRS. N. C. WHITTON & C. E. ABBOTT.
West Coast P. A.	...MESSRS. H. WADDINGTON & R. LESCHER.

SOUTH INDIA PLANTERS' WAR FUND.

	Rs.	A.	P.
Amount previously acknowledged	45,882	4	8
Mr. H. L. Pinches	60	0	0
Mr. H. M. E. Howson	60	0	0
Mr. J. S. B. Wallace	25	0	0
Mr. Stephen Bayly	10	0	0
Mr. V. L. Travers-Drapes	10	0	0
Total...	46,047	4	8

OVERSEAS AIR CRAFT FUND.

Balance	95	0	0

SOIL DENUDATION.

At the Meeting of the Board of Agriculture held at Pusa last February one of the subjects discussed was that of Soil Denudation and Surface Drainage.

The Report of the Committee which considered this subject is published in the *Quarterly Journal of the Scientific Department of the Indian Tea Association Part I*, 1916. It contains the following as regards Planting Districts as affected by this problem.

"The occurrence of Soil erosion in the monsoon-fed tracts of India is so widespread, and the loss of soil—the natural agricultural capital of the country—is so considerable that it is unnecessary in this report to attempt any summary of the literature of the notes submitted to the Board. There is very general agreement that soil denudation is exceedingly harmful and that it should be checked whenever possible.

"2. *Planting Districts.*—It is a fortunate circumstance that the Board, at this Meeting, included among its members a scientific officer who is conversant not only with the tea districts of North Eastern India but also with the circumstances of the planting areas in Ceylon and Java. The Committee attach particular importance to Dr. Hope's description of the elaborate systems of terracing and drainage for controlling the rainwash on the Java Tea Estates and they accept his views as to the general adaptability of these methods to conditions in Assam and elsewhere. His report will naturally form the basis for further work on this subject in India and it is suggested that his paper be printed in the *Agricultural Journal of India* so as to have the widest publicity possible. While no doubt an increased and increasing amount of attention will be paid to the prevention of rainwash in planting districts and to surface drainage generally, the fact remains that much irreparable mischief has already been done which can never be remedied by any system of manuring. It therefore, appears, desirable to consider, at this stage, whether something cannot be done to control planting enterprise in the future and to preserve the natural fertility of such areas. The Committee recommend that the Government of India be asked to bring to the notice of planters through the medium of the Indian Tea Association, the United Planters Association of Southern India, District Officers and other convenient channels, the fact that the serious losses due to soil erosion in the planting districts, which have taken place in the past, are to a large extent preventable. They invite attention to the notes on the methods of prevention adopted elsewhere in India in connection with other crops and particularly to the methods advocated by Dr. Hope and Mr. Anstead. Should precautions not be generally adopted in future when new areas are opened, steps may have to be taken to enforce regulations preventing erosion, when considering the terms on which these lands are given out to planters."

The conclusions and recommendations of the Committee may be summarised as follows:—

(*a*) That Dr. Hope's paper on the prevention of soil erosion in Java be published in the *Agricultural Journal of India* in view of the adaptability to Indian conditions of the methods described therein.

(*b*) That a Resolution be submitted for the consideration of the Board of Agriculture to the effect that the Government of India be asked to bring to the notice of planters through the medium of the Indian Tea Association, the United Planters' Association of Southern India, District Officers, and other convenient channels the fact that the serious losses due to soil erosion in

the planting districts, which have taken place in the past, are, to a large extent, preventable; that the most effective measures should be taken now on existing areas and when new areas are opened. Failing this, it may be necessary for Government to reconsider the conditions on which new lands are given out.

(*c*) That the Government of India be requested to place at the disposal of the Agricultural Department of Bombay an Engineer with experience and aptitude for agricultural work whose sole duties will consist in the preparation and execution of schemes of embankments and drainage adapted to local conditions.

(*d*) That the Board endorses the drainage scheme of the Commissioner of Tirhoot and considers that it is deserving of all official support possible.

(*e*) That any efficient experiments having for their object the discovery of the best means of increasing the duty of irrigation water should be encouraged and developed by the Agricultural Development."

The Note by the Deputy Director of Agriculture, Planting Districts submitted to the Board and referred to above reads as follows:—

"In Bulletin No. 53 of 1915, issued by the Agricultural Research Institute, Pusa, Mr. Howard calls attention to the damage caused in India by soil erosion and quotes the Hill tracts of the centre of Ceylon as an example where the agricultural capital of the land has been allowed to run waste.

"Numerous examples of the same thing are to be found in the Planting Districts of Southern India cleared of forest for the purposes of planting tea and rubber. As Mr. Howard says "little or no provision was made at the time (of clearing) to retain *in situ* the fine soil of the original forest and in consequence, the loss of soil has been enormous and is still going on." This process of loss is exaggerated by the pernicious system of "clean weeding" which is adopted on many of the estates and insisted upon by the visiting agents and company managers from home. Throughout the year the soil is kept bare of vegetation, except the actual crop, and each month it is weeded and scraped with mammooties, and each monsoon the fine surface soil is washed away and lost. The amount of this loss is evidenced by the streams and rivers in estate districts during the monsoon which are yellow with the charge of soil, while cases have been known of legal proceedings being taken by the holders of paddy lands in the valleys below on account of the silting up of their fields.

"Examples can be seen of the final results of this system of clean weeding on the Coorg Mangalore ghaut where land which was at one time planted with tea and coffee has now been abandoned and in place of the original jungle is now covered with scrub and lantana.

"The declining fertility of the ridges, the exposure of the surface roots of the tea at the top of steep slopes, and the number of bushes which have been thrown out of plucking on many estates all point the same way, and so serious is this problem of soil erosion, which the planters call "wash" becoming that the majority of estates are beginning to turn their attention seriously to its prevention, and are making attempts to restore the lost fertility of the soil by the addition of green dressings and manures, but even now insufficient attention is paid to the matter.

"In the case of tea especially large sums of money are expended in labour and manure with the object of producing a good tilth in the surface soil, and the top eight or twelve inches of the soil are full of plant food and bacteria. When this is washed away the loss is enormous.

"The remedy suggested by Mr. Howard is to terrace the land as soon as it is cleared. On some tea and rubber estates in South India this has been tried but the expense of the work is prohibitive over big areas. Various methods of cultivation can be adopted, however, which tend to produce natural terraces and reduce soil erosion to a minimum, and on a number of estates these methods have been adopted as a whole or in part with considerable success.

"In the first place as soon as the land is cleared it is drained along the contours, the drains being traced in at proper distances and with the correct slope to ensure a gentle flow of water. At intervals pits are dug in these drains which catch the fine soil in very heavy rain and the pits are periodically cleaned out and the soil in them put back between the rows of tea. Along the upper sides of the drains a hedge of some leguminous plant like *Sophora glauca* can be planted with advantage. This keeps up the bank of the drain and also checks the flow of the water on much the same principle as the turf on the sides of the surface drains at Pusa described by Mr. Howard. The hedge is kept low by periodically lopping it, the loppings being used to mulch the surrounding tea.

"In place of mammotty weeding hand weeding is being extensively adopted, the weeds being removed with a minimum disturbance of the soil. On steep slopes however, during the monsoon months the weeds should undoubtedly be only grass knifed and their roots left in the soil to aid in holding it in place. The opposition of the clean weeding school to this practice is based on the assumption that the weeds are extracting plant food from the soil and thus robbing the tea. It would appear however, that this does not much matter since the plant food in question is not being removed, and the weeds can safely be dug in in the dry weather, when they would extract moisture needed by the tea from the top layer of soil, and they then rot down and return the food they have extracted in an easily available form. The loss is thus merely a temporary one, the food elements being only locked up for a short time, while the loss caused by soil erosion is far more serious in that it is a total loss of organic matter, soil particles, bacteria and nitrates.

"The best practice of all, however, and one to which not enough attention is as yet paid in Southern Indian planting districts, is the use of cover crops of leguminous plants. These if kept on the soil during the monsoon reduce the amount of soil, erosion very considerably by increasing the amount of water absorbed by the soil, by retaining it on the surface for a longer time, and thus giving it a better chance to soak in. The soil is moreover kept more or less open by the roots penetrating it and these roots form channels along which the water may be conducted to the sub-soil. Cover crops also afford protection to the soil by retarding the movement of the water flowing over the surface and preventing the removal of soil particles.

"Many suitable plants for the purpose grow wild in the hills and are easily established as a cover crop. The seed may be collected and sown and the weeding coolies taught to leave the young plants. By means of such preferential weedings the desired plant can soon be established as a cover crop. Species of *Crotalaria*, *Cassia*, *Tephrosia*, and *Indigofera* are common and all are suitable green dressings not only aiding in the reduction of soil erosion but themselves supplying large quantities of nitrogen and organic matter when finally incorporated with the soil by cutting them down and using them as a mulch or digging them into the soil at suitable times,

"In this connection an experiment conducted in Ceylon and reported in the Peradeniya Experiment Station Progress Report of 19th March to 12th May, 1910 is significant. In this Experiment soil on a steep slope was treated in various different ways and the actual loss of soil caused by wash was measured. The results recorded were as follows :—

	Soil treatment.	Soil erosion in lbs.
1.	Plain deep forking	1,393½
2.	Blank (untreated)	814
3.	Dadap stumps (*Erythrina indica*) ...	330
4.	*Crotalaria incana*	309
5.	Mixed Crotalarias	176
6.	Albizzia plants	168
7.	Ipomoea	133
8.	Crotalaria across the slope	50
9.	*Desmodium triflorum*	30

"This experiment shows very plainly the effect of cover crops *Desmodium triflorum* is a close growing lover-like plant very common everywhere in Southern India and it has proved itself a most useful plant as a soil binder on very steep slopes.

"If all cultivation methods are carrid out along the contours of the slopes, instead of up and down them, there is a tendency for natural terraces to be formed which prevent erosion. Thus steep land may be weeded along the contours, and dug along the contours; the pluckers may be sent along the lines of the contours instead of up and down the slopes. Again, if the tea pruning are buried, which is a very general practice, the trenches to receive them may be opened in alternative lines along the contours and the prunings placed in them with the top layer arranged so that the brushwood is uppermost with some two inches left projecting from the surface. The pluckers work along the other row and the soil pushed down the slope and washed down the slope by surface water is caught by the projecting brushwood and largely retained.

"When a combination of the methods outlined above is adopted natural terraces are gradually formed and soil erosion reduced to a minimum in a practical way.

"Another form of soil erosion occurs in a few tea districts of Southern India, such for instance as the Travancore Hills. Here the land is very steep and the soil is of such a loose texture that in the dry weather it is apt to exceed the angle of repose and at the least touch to come sliding down. Wind even sets it moving, and the plucking coolies passing through the fields send the soil sliding down the slopes on to the roads. The loss of surface soil in such places is enormous and very rapid and the ridges are already denuded of surface soil. This is known locally as 'dry wash' and the methods of its control depend largely on keeping a cover crop on the ground throughout the year.

"I am in entire agreement with Mr. Howard as regards Planting Districts also when he says there is "no doubt that the natural agricultural capital of the country, the soil, is slowly running to waste, and that the first condition of improving crop production is to take steps to stop this constant erosion and to keep the cultivated soil in its place." The annual loss caused to estates where the monsoon rainfall sometimes reaches 40 and 50 inches in a single month must be enormous and sufficient attention is not paid to this loss by the general planting community."

(To be continued.)

MARKETS, PRICES, AND STATISTICS.

Coffee.

Monthly Statistics to 30th June.

	1916 Tons.	1915 Tons.
East India.—		
Landed to 30th June	1,990	3,137
Delivered to 30th June	1,734	2,299
Stock on 30th June	1,642	2,297
Coffee of all kinds.—		
Stock in U. K. on 30th June	33,518	24,550
Total European imports to 30th June ...	203,465	301,355
Total European deliveries do ...	202,415	299,595
Total European stock on 30th June ...	207,355	257,590
World's visible supply on 30th June ...	416,765*	442,590

*A decrease of 40,705 tons compared with a decrease of 41,820 tons last year.

Offerings at auction have been :—

——	4—6 July.	Since 1st Jan.	Last year.
East Indian ...	Nil.	25,719	32,931
Costa Rica ...	1,512	84,492	86,037
Other Milds ...	1,128	56,291	120,668
Brazil ...	1,035	57,413	97,840
Robusta ...	310	1,351	12,015
B. E. A. & Uganda ...	Nil.	7,369	10,197

Supplies in auction have been small and the market remains quiet. As will be seen from the figures below in spite of a very large (although not so large as was at one time expected) Brazil crop the visible supply is less now than it has been since 1901. The latest estimates for the new crop are about 10¼ Santos, 3 Rio.

30 June.	Total Brazil crop.	World's Visible supply.	Year's deliveries Europe & U. S. A.	Stock in Europe & U.S.A.	Futures current month.	Rio ex change	Milreis price.
1916	882,000	416,765	958,120	332,650	46/-	$12\frac{7}{16}$	6,600
1915	755,650	442,590	1,112,350	364,115	39/-	$12\frac{7}{8}$	4,700
1914	812,705	665,705	1,131,880	563,060	$41/10\frac{1}{2}$	$16\frac{1}{16}$	5,000
1913	675,590	605,175	1,024,115	490,295	44/-	$16\frac{1}{8}$	5,050
1912	733,175	647,355	1,064,175	499,650	$63/7\frac{1}{2}$	$16\frac{3}{8}$	8,050
1911	620,470	652,060	1,046,590	554,410	51/9	$16\frac{9}{16}$	6,600
1910	879,060	807,765	1,097,060	670,470	$31/7\frac{1}{2}$	$16\frac{25}{32}$	3,900
1909	730,530	754,115	1,113,175	686,235	$31/7\frac{1}{2}$	$15\frac{5}{32}$	3,550
1908	606,120	831,290	1,060,470	745,350	28/6	$15\frac{9}{16}$	3,450
1907	1,154,880	963,530	1,064,350	701,060	26/9	$15\frac{1}{4}$	2,550
1906	601,590	573,970	977,780	503,930	36/6	$16\frac{29}{32}$	4,200
1905	586,650	665,430	932,800	582,140	35/3	$16\frac{7}{16}$	4,100
1904	612,180	729,880	938,100	627,710	33/-	$12\frac{29}{32}$	5,400
1903	724,940	704,100	944.090	574,470	24/6	$12\frac{3}{32}$	3,700
1902	911,530	668,740	908,110	519,790	27/6	$11\frac{13}{32}$	4,000
1901	641,180	402,100	843,730	311,240	28/9	$11\frac{7}{16}$	4,500
1900	527,700	340,310	871,150	291,160	39/6	$11\frac{3}{8}$	6,800
1899	516,000	366,020	783,410	303,280	28/3	$8\frac{1}{8}$	6,400
1898	615,350	322,700	868,090	263,200	28/6	$7\frac{1}{2}$	7,400
1897	510,590	236,920	741,420	180,730	35/6	$7\frac{1}{2}$	8,900

Tea.

The following figures showing the export of Tea are published by the Indian Tea Association :—

		1916.	1915.
Sailings to Great Britain—			
From Calcutta, in June	...	8,316,348	11,559,305
From Chittagong, in June	...	2,558,141	1,828,930
From 1st April to 30th June	...	24,795,081	18,269,388
Sailings to Australia and New Zealand—			
In June	...	150	7,124
From 1st April to 30th June	...	283,036	53,083
Sailings to North America—			
In June	...	13,840	232,743
From 1st April to 30th June	...	304,103	253,020
Sailings to other places—			
In June	...	420,388	181,495
From 1st April to 30th June	...	7,472,903	2,192,375
Sailings from South Indian ports			
In June	...	1,360,249	1,929,539
From 1st April to 30th June	...	4,971,575	5,496,504
Total Sailings.			
In June	...	12,669,112	15,739,154
From 1st April to 30th June	...	37,826,698	26,264,370

The following are the shipments from South Indian ports in June :—

From Cochin.			
To London	...	...	426,204
To Asiatic ports	...	...	11,483
From Tuticorin.			
To London	...	...	239,580
To St. John N. B.	...	...	529,226
To Colombo	...	...	57,238
From Calicut.			
To London	...	...	88,133
To Bombay	...	...	8,385
			1,360,249

The exports of Tea from Ceylon from the 1st January to 17th July, 1916 were, black 97,925,849 lbs., green, 1,834,990 the corresponding figures for 1915 being 103,271,790 and 2,910,882 respectively.

In the latter part of the week ending 11th July there was a better demand and prices were steadier. The sales on 10th July showed good competition at full to dearer prices.

The following prices have been obtained for South Indian Teas.

—	B.O.P.	O. P.	Pek.	B. P.	P. S.	P. F.	Fgs.	Dust.
TRAVANCORE.								
Kolie Kanum ...	11¼	...	9¾	10½	...	...	...	...
Vembenard ...	...	...	9¾	10¼	...	...	...	...
Bon Ami ...	10¾	...	10	...	...	...	...	
Tunga Mullay ...	11	...	10	10½	9¾	...	...	...
Ladrum ...	11	...	...	10¾	...	...	10½	...
Periavurrai ...	1/-	...	11¼	1/-	...	11¾	...	...
Pambanar ...	...	...	...	11	...	...	...	...
Penshurst ...	11¼	...	10½	11	10¼	...	...	...
Bonaccord ...	10½	...	9¾	10	...	...	...	...
Vagavurrai ...	...	1/-¾	11¼	1/-¼	...	...	...	...
Fairfield ...	10½	...	9½	...	...	...	...	...
Kolam ...	...	...	9¾	10½	9½	...	9¾	9
Devicolam ...	...	1/-½	1/-	1/-½	11	...	...	...
Sirikundra ...	11¼	...	...	...	10	...	...	...
NILGIRIS.								
Cherakara ...	...	...	...	...	9¾	...	...	...
Mayfield ...	10¾	...	10¼	...	...	...	...	9¾
Peria Shola ...	10½	...	9¾	...	...	...	...	...
WYNAAD.								
Wentworth ...	11	10½	10¼	...	9¾	...	...	9½

Rubber.

Towards the end of the week ending 11th July although there was no marked improvement in the demand prices were put up to 2/4¾ for Crepe and 2/4¼ for Sheet, but things were soon a little easier and on 12th July were about ¾*d*. lower.

Agricultural Statistics of India.

NATIVE STATES.

In the *Planters' Chronicle Vol. XI, p. 256 Vol. I* of the Agricultural Statistics of India published by the Department of Statistics dealing with British India was reviewed. Volume II dealing with the Statistics of Native States for 1913-1914 has just come to hand and from it the following information has been extracted.

The total area of Native States in India is some 497 Million acres or 777 thousand square miles, with a population of 72 millions. These include the following :—

Madras States.	Area in Acres.	Population.
Travancore ...	4,043,000	3,429,000
Cochin ...	949,000	918,000
Pudukkottai ...	754,000	412,000
Banganapalle ...	163,000	39,000
Sandur ...	102,000	14,000
Mysore State ...	18,855,000	5.806,000

The following areas are under cultivation in the specified crops below in each State.

	Coffee.	Tea.	Cinchona.
Mysore	107,452	...	481
Cochin	2,509	...	...
Travancore	7,993	38,634	151

In Mysore State the following areas in acres are under Coffee cultivation in each District :—

Bangalore	2
Tumkur	5
Mysore	624
Hassan	27,344
Shimoga	309
Kadur	79,170

R. D. A.

HELOPELTIS.

The following account of the way in which *Helopeltis* is handled in Assam is given by the Entomologist to the Indian Tea Association in the *Quarterly Journal* of that body :—

"On this garden as on other gardens at this time of year, there were both pruned and unpruned tea. Some of the earlier pruned tea had already made six inches or more of new growth, while late pruned tea had made no growth at all. Cleaning out is done in this garden, and there were very few leaves left on the late pruned tea, yet a close search revealed the presence of eggs in shoots which had been left. In ten days or a fortnight, when these eggs would be hatching, there would be new growth on which the young bugs could feed. In the early pruned tea this had happened, and bushes were found with the new growth punctured, and the young bugs were caught on them. Adults and young were also to be found in the unpruned tea, but owing to their small numbers and the amount of cover afforded by the bushes were exceedingly difficult to catch. On the pruned tea, however, where the amount of foliage was small, the insects were very easily seen, and the bushes on which they were to be found were clearly distinguishable as one walked along the lines. Catching could therefore be carried out most profitably in the pruned tea, both on account of the fact that the insects could be very easily seen there, and because their depredations in this area would do most harm. It was therefore suggested that catching should be commenced directly the first pruned bushes began to put forth leaf, that catching should be commenced on the first-pruned section, the sections being visited in the order of pruning, and that each child should be made to take one line of bushes at a time. As he walked along this line, with his attention confined to that line only, he should notice every punctured bush. He should examine every leaf and shoot of a punctured bush in a very short time, and would then walk along until he came to the next punctured bush. Having finished one line, he would be given another. By organising the catching in this way very few tea mosquitos then present in that section should escape. The next pruned section should then be dealt with, and so on."

SISAL HEMP.

Duration of Life of the Sisal Hemp Plant.

A useful article on the cultivation of sisal hemp has been published in the *Bulletin of the Imperial Institute* (Vol. XIII, No. 1). One of the most interesting features of this article are the observations on the duration of the life of the plant, which we reproduce below. It will be remembered by our readers that this is largely bound up in the question of poling, and in the course of referring to this point in the following note, it is difficult to understand why no attention is given to the relationship between lime in the soil and poling established by Mr. Cousins in Jamaica :—

As has been already stated, the duration of life is determined by the production of the pole or inflorescence. In Mexico the plants are said to live for fifteen or sometimes even twenty-five years before poling, whilst in more tropical countries they live a much shorter period, the average length of life in East Africa being only about six years. In general the duration of the plant appears to be largely dependent on condition of soil and climate. It has been asserted that the life may be prolonged by cutting out the pole as soon as it appears above the leaves, the plant being thus rendered available for fibre for nearly a year longer than it would be otherwise ; but experiments which have been conducted in German East Africa do not support this view. The early poling of sisal plants in East Africa has been much discussed and has been regarded by some planters as a great disadvantage. It appears, however, that the comparatively short life is due to the fact that there are two growing seasons in that country, and growth is checked twice a year, whereas in less tropical countries there is only one growing season per annum. Thus it is evident that the plant in East Africa lives through approximately the same number of growing seasons as it does in other countries, but half as many years. Moreover, the number of leaves produced per plant (on the average about 200) is roughly the same in each case and hence the comparatively brief duration of life is rather an advantage than otherwise, as the total crop of the plant is produced in a relatively shorter time.

Since the plants in a sisal plantation do not all pole at the same time, the work can be carried on continuously by the intercalary method sometimes adopted in German East Africa. As the plant lives for only about six years, cutting can only be carried on for two or three years before it dies. New plants are therefore continually inserted between the old ones, so that when one plant dies another is ready for cutting, and the work of the plantation can proceed without interruption. Some planters, however, do not approve of this method, but prefer to let all the plants in a plantation pole and die, and then allow the land to lie fallow for a year or more before replanting.—*The Agricultural News.*

CORRESPONDENCE.

Stump Rot.

DEAR SIR,—I should be much obliged if the Scientific Officer would give his experience in regard to the following subject. A tea estate I am in charge of suffers greatly from stump rot, Pullwan shade was put in some years ago when tea was first planted, it is now necessary to take it out as it is too thick. If the stumps are cut down below the ground and covered over with say one foot of soil will that insure it against the stumps killing out the surrounding tea bushes ? Is it a fact that if stumps are buried deep enough they will not give stump rot. Trenches are not always effective.

Yours faithfully,

ENQUIRER.

The Planters' Chronicle.

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(INCORPORATED.)

Contents.

The concluding portion of Doctor Hope's valuable and interesting paper on Soil Denudation is published.

As Sir Thomas Holland will be attending the Annual Meeting we take from the *Madras Mail* some remarks made by the Hon'ble Mr. Gordon Fraser at an informal Conference with the Madras Chamber of Commerce. It will be noticed that Agriculture does not take a very prominent position in the enquiries of the Commission, but we hope that one of the results of the Commission will be the passing of an Adulteration Act, for which this Association has contended and supported for many years.

From the Export World and Commercial Intelligence we extract a short notice on Weights and Measures which shows the great strides the Decimal System is making. After the War there cannot be but great changes, and readjustment of commercial methods of computation will be amongst the foremost. "The old order changeth giving place to the new" and our present antiquated—not to say insular—methods must go by the board.

Some interesting information about the Nitrate Industry is published.

From "Somewhere" in France a letter has reached us from Mr. J. H. Cantlay, known to so many planters, expressing appreciation of Mr. Murphy's speech, and for the kind thoughts of brother planters for establishing the South India Planters' War Fund.

The many friends of the late Mr. J. A. Graham of Coorg will be pleased to hear that his majority has been antedated before his death and to hear that one of his daughters has been nominated by His Majesty to the College for Officers' daughters at Bath.

Next week the *Chronicle* will chiefly consist of the deliberations of the Annual Meeting, which promises to be full of interest. Delegates are beginning to arrive, and have already been calling at the Office. During the week there will be cricket matches every day with a band playing on four evenings.

It is to be hoped that the weather during the Annual Meeting will be fairer than it has been during the last week.

SOIL DENUDATION.

(*Continued.*)

Dr. Hope's valuable and interesting paper on the subject appears in the *Agricultural Journal of India* for April, and gives a description of the methods adopted in Java to prevent soil erosion on the Tea Estates. It reads as follows:—

"The question of soil erosion in India in most of its aspects has been discussed recently by the Imperial Economic Botanist, and this note is submitted only because it contains a few observations on the way in which soil erosion is dealt with in a neighbouring country, where the problem is of great importance and in many respects similar, and because it may help to identify the agriculture of tea with that of other crops in India in respect of the necessity for improving existing methods of prevention of loss of soil by wash. Although there are many features of tea cultivation which make tea a thing apart from other agricultural operations in India, this is a point where the interests of tea planters are identical with those of other agriculturalists.

"The retention of soil on sloping land by prevention of wash is of considerable importance to the tea industry of North-East India not only in Darjeeling, where land slopes vary steeply, but in other parts of the tea districts where estates are generally fairly level.

"The conditions under which soil erosion takes place in the different tea districts of North-East India may be described as follows:—

"In Assam tea land is usually level but it is intersected by *hullas* or *nullahs* (natural depressions which take off surface drainage), some of which are filled with jungle, while rice is grown in others. Tea which has been plated for many years on the edges of such *hullas* shows in most cases unmistakable signs of having suffered from the soil erosion which has taken place.

"In the Dooars tea land consists of a bank of heavy loam extending several miles from the foot of the Himalayas southwards towards the plains and below this of level land, the soil of which is in most places grey and sandy. There is a definite drop of a hundred feet or more from this red bank to the plain below and similar breaks occur at places in the red bank itself. The tea land of the Dooars is intersected by rivers which flow directly from gorges in the hills, and in time of heavy rain these are rapidly flowing torrents; in the cold weather they are almost dry. These rivers often alter their line of flow and tea consequently is not usually grown near their banks. In many places near the hills the surface of the stiff red clay loam is undulating. It is on this red bank that the most serious problems of soil erosion have to be faced, and, with a rainfall sometimes as high as 200 inches per annum, and confined chiefly to a few months in the year, the loss by wash is considerable. The fertility of this red soil suffers very seriously when wash has taken place.

"In Cachar and Sylhet a particular feature of tea lands is the presence of steep rounded *tilas* (low hills projecting from the level plain) interspersed among flats of different and more recent soil. The *tilas* are sometimes quite sandy, sometimes gravelly, but often of fairly stiff clayey soil. The soil of the flats ranges between a heavy intractable clay and a coarse sand, poor chemically. A special type of such flats are the drained *bheels* (peat bogs) in which the percentage of organic matter may range between 15 and 70 per cent. The prevention of soil erosion is of particular importance in this district in connection with the loss of the fertility of the *tilas*.

"In Darjeeling the soil at higher elevations usually consists of a heavy reddish clay and that at the highest elevations is overlaid by a fairly deep humus layer and wash is not very serious. At medium elevations this clay suffers from wash and the fertility of the land has consequently deteriorated.

At medium elevations also some very sandy soils occur and these have suffered very considerably from wash. At lower elevations near rivers where the land is less steeply sloping some rich alluvial sandy stretches are found which have been formed at the expense of the fertility of the ridges and hill sides above.

"Throughout the tea districts, with the exception of a few gardens in Darjeeling and on some of the *tilas* in Cachar and Sylhet, the arrangement of tea bushes is in square or triangular alignment and, in solving the problem of protecting estates from loss of fertility by soil erosion, the treatment of considerable areas of old tea, planted in this manner (a most objectionable one on land where serious loss of soil by wash is likely to take place) many years ago, has to be considered, in addition to devising the best means of laying out and planting such slopes on land which is being put under tea for the first time.

"At the end of the year 1913 the writer spent some weeks in Java and Sumatra and was much impressed by the means which are taken in these countries to prevent loss of surface soil by wash on tea estates as compared with the efforts made to this end in Ceylon and North-East India.

"The whole of the tea districts of Java are sloping land, and it is the invariable custom to plant tea fairly closely on contour lines as distinguished from square or triangular arrangement, the result being that in no cases are there spaces between the bushes in straight lines of any length down slopes such as can be seen on every tea estate in Ceylon and on many estates on sloping ground in North-East India where the planting is in square or triangular alignment. Contour planting is undoubtedly the better method whenever there is possibility of serious erosion.

"This being the first step taken by Java planters, other means are adopted according to the nature of the land and these consist in terracing, where the land is steeply sloping, and in arranging a system of contour drains, contour hedges of suitable leguminous plants, and series of catch-trenches in contour alignment, in less steeply sloping situations.

"Opinions differ in different parts of the world as to the value of terraces, a fact which seems to indicate that there may be some factor as yet not fully understood which accounts for terraces being of use in some places while in others their value appears to be doubtful. In Ceylon tea estates terraces are rarely seen in spite of the fact that much of the tea land is more steeply sloping than on most estates in Java. It is surprising that in Ceylon the terracing which is so picturesque a feature of the journey from Colombo to Kandy has not been copied on tea estates and the omission has undoubtedly been an error in judgment though it has been a still greater mistake to have adopted linear instead of contour planting on sloping ground.

"In Java, certainly, nearly everyone is persuaded of the value of terraces on steeply sloping ground.

"Opinions differ in Java as to whether terraces should be made before the tea is planted or afterwards. The argument in favour of making the terraces before planting the tea is that the work can then be done carefully and completely without any disturbing factors, and, being done, is done once for all, and when the tea is eventually planted it merely remains to adopt an efficient system of keeping terraces in order. Those who are in favour of making the terraces after planting out the tea base their argument on the fact that in such cases the tea is planted in surface, and not in sub-soil, and that if the weeds, when they are gathered, are regularly placed between the rows of tea, planted in contour lines, terraces form of themselves and are in all respects as efficient as those made more expensively before the

planting out of the tea. It is possible however to make terraces before the tea is planted out, in such a way that the seedling plants are planted along the lines of trenches which have been filled in entirely with surface soil, and it is more satisfactory from several points of view to make terraces before the seedlings are planted.

"Terraces having been made the upkeep of them is a matter of great importance. In Java many different plants are used to protect the edges and faces of terraces and are either planted there directly or, if of naturally occurring species, are encouraged to grow in preference to other plants by a process of selective weeding of the terrace faces. Species of *Hydrocotyle*, *Viola*, *Desmodium*, etc., are commonly seen grown in this way.

"On fairly broad terraces it is often the custom to dig short trenches at intervals along the inner edge of each terrace and these serve to catch the wash which comes from the terrace above. These catch-trenches are cleaned out when the terraces are weeded, and the earth which has collected in them is thrown up on to the terrace above.

"The system is an excellent one under Java conditions where weeding and forking, instead of hoeing, is the method of cultivation.

"A similar system of catch-trenches is employed largely in cases where the land is not steep enough to terrace. The method then generally adopted is one of alternate contour lines of catch-trenches and of green crops, sometimes with one and sometimes with two lines of tea between them. In such cases the positions of the catch-trenches, which are usually about 12 feet long by 1 foot broad by 1½ feet deep, alternate with 12 feet intervals along the contours, and are arranged in echelon with those next above or below along different trenched contours, so that if any earth is carried beyond one line of catch-trenches and past the intermediate tea bushes and green crop hedge, it will eventually be caught in the next catch-trenches below. When these catch-trenches are cleaned out, which is usually done at the time of weeding, earth is thrown up the slope.

"Leguminous plants such as *Leucaena glauca*, *Clitoria cajanifolia*, *Tephrosia purpurea*, etc., are the plants most commonly used for the hedges which alternate with the catch-trenches.

"Combined with this is a careful system of drainage.

"The main drain system—it must be remembered that almost without exception fairly steepy sloping ground is under consideration—consists of 'hoeft afvoergoten' (main drains) which lead directly down the slopes. It is considered most important in connection with the drainage system to remove as far as possible the excess water which cannot sink into the ground sufficiently rapidly in case of heavy showers.

"The soils of Java are very porous and when slight showers fall the rain sinks rapidly into the ground, but the soil is also very rapidly washed down by water flowing over the surface of the ground, if all the rain water is not immediately removed when heavy rain falls. This is at once the advantage and the danger of the soil of Java.

"To prevent this loss by wash, it is considered of primary importance to have an escapement for excess water, and the main drains straight down the slopes serve this purpose best for they ensure the rapid removal of water at places which are chosen for the purpose, and not at places where the rush of water may do damage.

"The best situations for some of these drains are the places where there are natural gullies down the concave folds of the hillsides. Where these gullies are pronounced in character one usually finds either rocky ravines, or rather water-logged patches filled with deep rich soil which has been carried there by wash before the opening up of the land. The stone

ravines can be used as drains without much being done to them. They are straightened and cleaned out to some extent to facilitate the rapid removal of water. Gullies which are filled with deep earth, when drained, add to the area on which tea can be planted. The sides of these drains are protected by growing grass on them and the rush of water down them is stopped by a series of low barriers of stones, bamboos, etc. A certain number of 'hoeft afvoetgoten' is usually not more than 100—200 yards.

"The collection of the water into these main drains is carried out by means of contour drains 'afvoegoen' and these are usually made with a very slight gradient, the object being merely to catch the water and remove it into the 'hoeft afvoergoten' or main drains. These 'afvoergoten' are laid out very carefully on Dutch estates in Java, and are flanked on the upper and lower sides by banks on which suitable leguminous plants are grown. Grass is often grown on the sides of the drains themselves. Drains are cleaned out periodically, for the danger of water breaking through must be carefully avoided since it would cause great damage because it would mean the escapement of water down hill at a point for which preparation for its control had not been made.

"Modifications of one or other of these methods is the system adopted in Java for the prevention of wash, and on some of the new tea estates which are being started in Sumatra.

"There is some difference of opinion in Java as to the extent to which cultivation is a factor in aggravating loss of surface soil by wash. Some claim that if soil be cultivated at times of the year when there is much rain, the rain, instead of washing the soil with it down the slopes, sinks into the ground and thus wash would be prevented. Others say that if the soil is undisturbed, and particularly if it be protected with a slight covering of jungle, wash will be inappreciable whereas it will be considerably greater if the soil has been recently cultivated and is broken up and free of jungle growth. Very much depends on the nature of the soil and this is a subject which might receive study in connection with loss of soil by wash in India; that is to say, it would be worth while to determine, in districts where loss of surface soil by wash is known to be great, the effect of cultivation in aggravating or reducing the amount of wash and to correlate this information with data bearing on the mechanical composition and physical properties of the soil.

"There is another point which has so far been left out of discussion on the subject of soil denudation in India and that is the extent to which dry wash—that is, movement of particles of soil down hill in dry weather as the effect of wind—takes place. In Java, this dry wash takes place chiefly at medium elevations where the soil is loamy in character but is of sufficiently good tilth to pulverise on the surface in dry weather. The compact soil immediately below the loose layer on the surface affords a comparatively smooth plane down which detached particles of surface soil are blown by wind. These particles collect behind tea bushes and stones and on the flat faces of terraces and are washed down in the form of mud by the first heavy shower of rain.

"The extent of the loss of soil which is going on steadily in this way in dry weather is undoubtedly very great in some districts of Java, and it would be interesting to determine whether a similar phenomenon takes place to any great extent in India and in what localities it occurs particularly.

"Speaking of tea planting only it may be said that the methods employed in Java appeal to the writer as being unquestionably the best that can be done to prevent loss of surface soil, and although it is a matter of great expense and tropical agriculture is becoming yearly more intensive and new

land cannot be obtained to replace by new clearances the older parts of existing estates, all that can be done to prevent loss of surface soil on existing estates has a very great commercial value.

"The adaptation to the conditions which obtain in the tea planting areas of India, of Java methods should receive careful consideration.

"The present measures adopted for the prevention of wash in the tea districts of Ceylon and North-East India appear to be largely wrong or inadequate."

The Weights and Measures Handicap.

The Decimal Association, which always had a strong case, has this year a stronger claim to consideration than ever.

Whatever may be the terms imposed when peace is concluded, the Association anticipates that the competition of the Central Powers for the markets of the world will be fiercer than it has been in the past. The annual report states than even now factories are piling up stocks which German and Austrian travellers will offer to our customers in terms of weight and measurement which they will understand, and these goods will have been manufactured in the same terms of weight and measurement as those in which they are offered for sale. In their case the handicap which is imposed on out manufacturers will be absent. The handicap exists because (1) the manufacturer must maintain two systems in his works and in his office; (2) the British weights and measures are unsuitable through their complicated irregular nature, both for manufacture and for commerce.

What chance have we of maintaining our trade unless we also organise our resources and improve our methods in order to meet and defeat this scientific competition? It would be foolish to deny that our weights and measures are a handicap on our export trade.

Were it advocating a step in the dark, the Decimal Association would be more diffident of pushing the claims of the metric system and decimal coinage, but we have the experience of many nations to guide us, and in no case has the reform once properly introduced failed to bring with it great benefits.

One of the results of the war is the remarkable extent to which the metric system is being assimilated in the life of the nation. The presence of our military men in France and Flanders, and of Belgian and French refugees in our midst has helped to this end.

There is a special note of warning in relation to South American trade, and we are asked: "Do British manufacturers and merchants really intend to capture this trade, that has been for so many years in the hands of the Germans, or not? The South American Republics all use the metric system, while British traders with few exceptions not only neglect to use it, but only too often waste time and money by sending out catalogues to the South American markets in which tons and pounds and yards and inches figure to the bewilderment of the buyer.

The Buenos Ayres Standard says that before the war Germany supplied 37 per cent. of machinery against our 30 per cent. For electrical machinery the discrepancy was more marked, being 75 per cent. against our 13 per cent. In 1912 Germany supplied one-third of the iron and steel goods imported into the Argentine against England's one-fifth. The metric system has been so triumphantly successful that it is certain, sooner or later, there will be no market in which it is not used. If England wants to capture South American trade she will have to wake up in this direction.—*The Export World and Commercial Intelligence.*

THE INDUSTRIES COMMISSION.

Sir Thomas Holland, the Chairman of the Industries Commission had an informal conference with the Madras Chamber of Commerce on Wednesday, 2nd August. The Hon'ble Mr. Gordon Fraser, the Chairman of the Chamber of Commerce in the course of his address of welcome to Sir Thomas Holland is reported by the *Madras Mail* to have said:—

"In agriculture there are a hundred and one different ways in which improvements could be made. Again, in the marketing of crops there are dozen of ways in which improvements could be brought about by starting small industries. Then there are various processes through which our crops could be put before they are placed on the foreign markets. I may mention a few of the industries which I would suggest as deserving of consideration—indigo, decortication of kernels, pumping plants throughout the Presidency, fibre production, treatment of cotton, bamboos, paper-making, oil-pressing which has a good future before it, manufacture of cattle food from oil cakes, manufacture of manures, chemicals, soap-making, fishing industry and its bye-products, tanning extraction, and many others; I might add tile making. It has always struck me as curious that tiles should be coming from Europe when we have all the facilities in Southern India for making them. In the case of mining leases, for mica, magnesite, manganese, etc. I think more assistance might be given by Government to capitalists than has been done in the past.

"Expert and Government assistance are desirable in many industries, but in many cases, especially in connection with crops of the Presidency, improvements and industries ought to be initiated by the people themselves; the openings are there, and promise a very fair measure of success without expert or Government assistance. I think a good deal of Indian money is probably locked up in land, and does not go into industries. Indian business men rarely have the necessary cash balances available for investment in industries. The planting industry, tea and rubber, is one of the few which has made satisfactory progress in recent years."

Sir Thomes Holland in his reply made it plain that the Commission did not propose to deal with Agriculture. He is reported to have said:—

"Mr. Gordon Fraser had suggested agriculture, forestry and mining as subjects for enquiry by the Commission. Sir Thomas Holland said that the Commission would be devoting less attention to those matters than to other things, not because the Commission did not realise their importance, but because the Government had already initiated a wise policy for their encouragement. Government had introduced a large number of scientific and technical experts who had already greatly assisted in the improvement of both agriculture and forestry. He had not the slightest doubt that the experiments so far made showed that the Government could wisely employ more money in the development of agriculture."

In concluding the Conference the Hon'ble Mr. Gordon Fraser said:—

"The general scheme as put forward by Sir Thomas Holland was a most excellent one, and if the Commission found it practicable to work on the line suggested by Sir Thomas Holland, he certainly thought that much good would result to the industrial world. The institution of Government certificates of purity, Mr. Fraser thought, would be very sound indeed. To pass an Adulteration Act would be going one better and he hoped that Sir Thomas Holland would press for it. A Central Research Institute for chemistry would be a great help, and

chemistry came in in so many industries. As regarded agricultural industries, although they were not coming in the forefront of the enquiry, he hoped some attention would be given to them. Sir Thomas Holland had mentioned that industries in connection with agriculture were not sick, but Mr. Fraser was of opinion that they were very sick indeed, but unfortunately with a complaint that they hoped had been diagnosed and that they were now under correct treatment. The Agricultural Department had certainly been doing most excellent work for the last two years, and improvements made had been very considerable indeed. The Forest Department, he knew from experience, was also ready to assist any one who sent in to them any enquiries, and the officer of the Economic Forestry at Dehra Dun answered every enquiry put before him in a manner worthy of the best business firms. (Laughter) As regards the improvement of labour, there was plenty of room for this. The educated classes did not take kindly to manual labour. He had seen a letter from an educated Indian who had worked one week in a mill and then promptly retired, and in it he wrote that he looked back "with horror and dismay to the time he had worked as a cooly." In conclusion, Mr. Fraser thanked Sir Thomas Holland on behalf of the Chamber for the clear exposition he had given of the lines on which the Commission proposed to work. The statement made by him was a clear and business-like one, and if the Commission would work on the lines Sir Thomas Holland had laid down, he was sure they would have very satisfactory results."

SOUTH INDIA PLANTERS' WAR FUND.

	Rs.	A.	P.
Amount previously acknowledged	46,047	4	8
Mr. Lescher	25	0	0
Mr. A. Yates	40	0	0
Mr. D. V. Crowe	7	8	0
Mr. L. E. Kirwan	100	0	0
Mr. J. S. Wilkie	30	0	0
Mr. W. H. G. Leahy	20	0	0
Mr. W. A. J. Milner	20	0	0
Total...	46,289	12	8

OVERSEAS AIRCRAFT FUND.

Balance	95	0	0

CORRESPONDENCE.

FLETCHER NORTON, ESQ.,
Bangalore.

Dear Sir,—I have to thank you very much for yours dated 9th November, 1915 for which I hope you will accept my apologies for not having answered before. I am more than grateful to the planting community of Southern India for their splendid offer of assistance and would gladly accept the offer in the same spirit as it is accorded, should at any time such a thing be necessary.

I have read Mr. Murphy's speech of 19th August, 1915 and shall be glad if you will convey to him my very great appreciation for his kind thoughts towards his brother planters who are doing their bit for the old country, and to all the subscribers to the South India Planters' War Fund and hope to be able to thank them in person when hostilities cease.

Yours faithfully,
J. H. CANTLAY.

NITRATE INDUSTRY AND THE WAR.

The publication of a useful brochure by Messrs. Allen Bros., and Co., Ltd., of Calcutta, upon tea fertilisation in India, comes at an opportune moment, when the manurial qualities of nitrate of soda are becoming widely recognised by planting communities, the demand for the commodity for military purposes being constantly enhanced while the war continues. It must be consoling in one sense for Mr. Runar Olsson-Seffer, the director in this country of the Chilean Nitrate Propaganda, to realise that there are now no enemy vessels of any sort which are capable of interfering with the passage of nitrate cargoes from South America to Indian ports. While they are able to contemplate with serene mind the splendid isolation of India from direct war disturbances it is tantalising for them on the other hand to realise the impossibility of taking full advantage of the opportunities thus provided while merchant tonnage remains in scarce supply. The propaganda is writing big business, no doubt, for the popularity of this manure is growing apace among the tea planters of Northern India; but the results achieved by the Chilean Nitrate Propaganda and by Messrs. Allen Bros. would be far greater if freights were more accommodating and if there were more vessels available. As regards the industry itself the hopeful tone of the Chairmen's speeches at recent company meetings point to a revival in trade and a brighter outlook. It will be seen from the following figures of production, in quintals, that this year's output is much greater than that of 1915, although it has not yet regained the position secured in the pre-war period:—

1913-14	...	...	61,037,420
1914-15	...	...	40,736,770
1915-16	...	...	52,177,180

Few industries, it is safe to say, were more severely hit in the earlier stages of the war than that of nitrate production, and when hostilities broke out it was suddenly thrown into a state of stagnation, as the principal consumers of the fertiliser—namely, the Central Empires, and Germany in particular—were suddenly prevented from absorbing supplies. The result was that many oficinas were closed down, and it is estimated that out of a maximum of 134 reached before the war only 34 were at one time working. The grave disturbance that ensued may be imagined. Companies which before the war were highly prosperous were suddenly prevented from earning any profit whatever, while others were involved in losses in meeting their standing charges and other expenses. But the autumn of last year saw a recovery in the demand for nitrate and a revival in the price, with the result that a large number of producing companies re-opened their works, though few of them attempted to operate to their full capacity. The reviving demand, it may be explained, was partly in connection with the requirements of the manufacturers of certain classes of munitions and partly in connection with the need for the important by-product iodine brought about by the war. That commodity is indispensable in treatment of the wounded, and the demand has been so great that the price, which was 1½*d.* per ounce before the war, has since risen to 10½d. The consequence was that companies, instead of limiting their production, extended it to proportions unknown in peace time. The industry has still a number of difficulties to contend with, but its position is more promising to-day than it has been since its methods were reorganised some years ago. As the chairman of the New Paccha and Jazpampa Company remarked at the recent shareholders' meeting, 85 per cent., of the manufac-

turing companies in Chile are now using oil fuel, and, fortunately for them, their forward contracts for oil are still running, so that many of them are still able to continue, in spite of the low prices of the product now ruling. Coal-consuming companies are less fortunately situated, for, owing to high prices and freights, coal can only be obtained on prohibitive terms. Dear coal must continue to retard the opening of many oficinas, but, as the overwhelming majority of companies are now using oil, production, on the whole, should not be retarded to an appreciable extent.—*Commerce.*

Chilean Nitrate.

The present demand for Iodine has, I understand, resulted in the indefinite postponement of the Chilean Iodine Propaganda. This propaganda did not seek to interfere with the existing Iodine trade arrangements, but to promote the use of the tinctures of Iodine, and to extend the knowledge and use of the chemical throughout the world. Chilean Iodine should secure a much larger share of the market for farm disinfectants than that which is now enjoyed by coal-tar products, such as Creosotes, Lysol, and various forms of carbolic acid and related bodies. It may be added that at the present time certain coal-tar products and Hydrogen Peroxide are largely being advertised and pushed for sale among farmers. Tinctures of Chilean Iodine are much superior to these articles for use in animal husbandry and in farm households for first aid work, and I believe that they would have a large use if their merits were adequately presented.

The method pursued for the promotion of the use of Iodine among cultivators and planters would be substantially the methods which are now followed by the Chilean Nitrate Propaganda for increasing the use of nitrate of soda. Agricultural and other officials would first of all be advised as to the merits of the tinctures of Chilean Iodine and urged to recommend its use as an antiseptic and disinfectant on farms generally, for the prevention of and first aid for pathogenic conditions in the household, in the field and in the stable. The programme cannot however be carried out until the war is over.

The small amount of Iodine left in nitrate of soda is sufficient—in addition to the caustic effect of its alkalinity—to make nitrate an effective insecticide and fungicide for plant-diseases. Owing to the difficulty of securing the commodity and the enormous increase in price of sulphate of copper, tea planters are adopting nitrate of soda as a fungicide for tea diseases. The additional advantages of obtaining the fertilising effect from nitrogen and the stimulation from Iodine on soil fertility, acid rectifying and potash releasing effects from the sodium, by using nitrate of soda as a fungicide can be realised. The importation figures in India, Ceylon and Mauritius for the last two fiscal years adequately prove the usefulness of this product:—

Fiscal years.	Nitrate of Soda.
	Tons.
1914-15	981
1915-16	8,587

When the usefulness of tinctures of Iodine becomes better known among the rural classes in India I can foresee a wonderful improvement in the health conditions of both people and of their domestic animals.
SCRUTATOR.—*Commerce.*

Tea Fertilisation.

A revised and extended edition of the Tea Booklet, issued by Messrs. Allen Bros. and Co., Ltd., of Calcutta, makes its appearance this week. It is the purpose of this edition to convey to the tea planter, in as concise a manner as possible, some practical hints on the manurial requirements of tea, and to suggest a few combinations of manures which will be found effective and profitable. It is impossible always to recommend what might be the best manurial treatment in the absence of such details as the climate, the soil and the condition of the bushes; but by giving in simple words a brief description of the principles which underlie successful and profitable manuring it is hoped by the authors of the pamphlet that tea planters may soon be able to determine the combination of manures which will produce the most profitable results suited to their own particular conditions. It is but reasonable to suppose that a planter knows his soil and tea plants better than any one else; the suggestions made are applicable therefore in principle only.

I am prevented by lack of space from republishing, as I would like to do, some of the most useful of the many useful hints which the book contains. The subject-matter is, moreover, somewhat too technical for these columns. But I may possibly have an opportunity of some future date of writing generally, in unacademic fashion, on a topic which is of vast importance to this country, where the cultivated areas with the exception of the tea gardens have been reploughed and resown again and again without cessation from time immemorial. The question of manurial treatment cannot be overestimated in the importance of its application to fatigued and worn-out soils in a country like India, which has provided sustenance for countless generations of one of the world's oldest, if not actually the oldest, civilisations. The tired soil requires stimulants, just as the human frame does when overworked, and the little book published by Messrs. Allen Bros. and Co., Ltd., should be of interest to many other people besides those who are responsible for the great tea industry.—*Commerce.*

AN ANECDOTE FROM SIR J. HENNIKER HEATON'S LIFE AND LETTERS.

Once and once only during his parliamentary career H. H. crossed swords with the War Office, and succeeded in hacking his way through the barricades of red-tape until he reached head-quarters, where the enemy capitulated. The facts were these. A lady wrote to H. H. to tell him that his son at Harrow had been ploughed for the Army, and asking him to use his influence on his behalf. The boy in question was captain of the cricket eleven at Harrow and devoted to all sport, a born leader and one of the most popular boys in the school. The sole fact that R. was captain of the Harrow eleven was sufficient for H. H.—as undoubtedly it would have been for the Duke of Wellington!

The correspondence between H. H. and the War Office, were it permissible to publish it, would make good reading. There could only be one end to such a combat and R. is now a major in the—Hussars. In the course of championing the claims of his young friend, H. H. had an interview with a very important bigwig:

"Look here, Henniker Heaton," said General Sir W.——, "examinations are all nonsense. When I joined the Army forty years ago the test they set us was to say the Lord's Prayer and to write our own name—and by the Lord Harry I was plucked the first time!"—*The Bodleian.*

SCIENTIFIC DEPARTMENT, U P. A. S. I.

Scale of Fees for analysis in the Bangalore Laboratory.

A.—SOILS.

		Rs.
1.	Complete Chemical Analysis, including the available Potash and Phosphoric Acid	...40
2.	Mechanical Analysis	...10
3.	Complete Chemical and Mechanical Analysis ...	...50
4.	Calcium carbonate and oxide content	...10

B.—FERTILISERS.

1.	Potash in Potassic Fertilisers	8
2.	Phosphoric acid, total and citrate soluble, in Phosphatic Fertilisers	8
3.	Organic Matter, Insoluble Matter, and Nitrogen in Poonacs, &c.	6
4.	Organic Matter, Insoluble Matter, Nitrogen, and Phosphoric acid in Bones, Fish, &c.	8
5.	Complete Analysis of Fertilisers such as Composts, Cattle manures, &c.	...20
6.	Complete Analysis of Lime, Limestones, and Slaked Lime	...10

Half the above rates will be charged to all Members of District Planters' Associations.

For methods of taking samples of Soils and Fertilisers and the quantities to send for analysis see *Planters' Chronicle* Volume X. pages 207 and 216.

All samples for analysis should be sent plainly labelled to "The Planting Expert, 25, South Parade, Bangalore," and should be accompanied by a covering letter giving full information about the sample and the analysis desired according to the above table. Fees should be remitted to "The Secretary of the United Planters' Association of South India, 25, South Parade, Bangalore."

The Planters' Chronicle.

RECOGNISED AS THE OFFICIAL ORGAN OF THE U. P. A. S. I., INCORPORATED.

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THE U. P. A. S. I.

(INCORPORATED.)

Twenty-third Annual Meeting.

The Twenty-third Annual Meeting opened at Bangalore on the 14th August, 1916, at 2 P.M., at the Mayo Hall, the following being present:—

CHAIRMAN	MR. C. H. BROWNE.
PLANTING MEMBER OF COUNCIL ...	THE HON'BLE MR. E. F. BARBER.
VICE-CHAIRMEN	MR. H. WADDINGTON. MR. J. S. NICOLLS.
DEPUTY DIRECTOR OF AGRICULTURE, PLANTING DISTRICTS ...	MR. R. D. ANSTEAD, M.A.
DIRECTOR, LABOUR DEPARTMENT...	MR. AYLMER FF. MARTIN.
SECRETARY	MR. FLETCHER NORTON.

Delegates.

Anamalai P. A.	...MR. J. HATTON ROBINSON.
Bababudin P. A.	...MESSRS. L. E. KIRWAN & S. H. DENNIS.
Central Travancore P. A.	...MR. T. C. FORBES.
Coorg P. A.	...MESSRS. P. G. TIPPING & A. H. JACKSON.
Kanan Devan P. A.	...MESSRS. E. A. HUGHES & A. J. WRIGHT.
Mundakayam P. A.	...MR. S. P. EATON.
Nilgiri P. A.	...MESSRS. J. S. NICOLLS & A. S. DANDISON.
North Mysore P. A.	..MR. W. H. REED.
Shevaroy P. A.	...MR. E. TRAVERS-DRAPES.
South Mysore P. A.	...MR. C. LAKE.
South Travancore P. A.	...MESSRS. A. W. LESLIE & J. B. COOK.
West Coast P. A.	...MESSRS. H. WADDINGTON & R. LESCHER.
Wynaad P. A.	...MR. C. E. ABBOTT.

Visitors.

The Hon'ble Mr. H. V. Cobb, C.S.I., C.I.E., Resident in Mysore.
Sir Thomas Holland, K.C.I.E, Chairman, Commission of Industries.
Sir M. Visvesvaraya, K.C.I.E., Dewan of Mysore.
Mr. H. F. Anderson.
The Revd. F. Breedon.
Doctor Coleman, Director of Agriculture to the Mysore Government.
Mr. A. R. Cox, I.C.S.
Mr. A. C. W. Denne.
Mr. L. Egan.
Mr. W. Petrie-Hay.
Mr. St. Clair Johnson.
Mr. J. W. Keith, (Messrs. Parry & Co.)
Mr. F. Kerr.
Mr. W. A. Lee.
Mr. T. Love.
Captain F. Mackay.
Mr. W. R. T. Mackay, (Agent, Bank of Madras).
Mr. W. McRae, Government Mycologist.
Mr. W. D. Martin.
Mr. Pell.
Mr. H. L. Pinches.
Mr. G. Richards, Engineer-in-Chief, Mysore and West Coast Railway Survey.
Mr. W. C. Rose, Agent, Bank of Mysore.
Mr. G. A. D. Stuart, I.C.S., Acting Director of Agriculture.
Mr. A. Thomson.
Mr. R. Thomson.
Mr. S. J. Wilson
Mrs. Anstead.
Mrs. Browne.
Miss Ellen Browne.
Mrs. Egan.
Mrs. Forbes.
Miss Grant.
Mrs. Petrie-Hay.
Mrs. Lee.
Mrs. Aylmer Martin.
Mrs. W. D. Martin.
Mrs. Nicolls
Mrs. Pinches.
Mrs. J. H. Robinson.
Mrs. A. Wright.

AGENDA PAPER.

1. Secretary's Annual Report and Statement of Accounts.
2. Chairman's Address.
3. Report of Labour Director.
4. Report of Deputy Director of Agriculture, Planting Districts.
5. Work of Planting Member.
6. Agricultural Matters.
   - (*a*) Lectures by Dr. Coleman and Mr. W. McRae.
   - (*b*) Pests and Diseases.
   - (*c*) Fertilisers.
   - (*d*) Pest Act.
   - (*e*) Rubber Growers' Association.
   - (*f*) Programme of Deputy Director of Agriculture, Planting Districts.
   - (*g*) Re-organisation of the Scientific Department.
   - (*h*) Analytical Branch of the Scientific Department.
7. *Roads and Communications—*
   - (*a*) Arsikere-Mangalore-Railway.
   - (*b*) Feeder Roads in Shevaroys.
8. *Legislation—*
   - (*a*) Sale of Waste Lands in Nilgiris.
   - (*b*) Factory Act and Regulations.
   - (*c*) Excess Profits Tax.
   - (*d*) Income Tax.
   - (*e*) High Court Ruling in connection with Court Fees.
   - (*f*) Mercantile Shipping Tonnage.
   - (*g*) Export Duty on Tea.

9. Planters' Benevolent Fund.
10. " Planters' Chronicle."
11. St. George's Homes.
12. British Empire Union.
13. Alien Enemies.
14. Finance.
    (*a*) War Fund.
    (*b*) Air Craft Fund.
    (*c*) Budget, 1916-17.
15. Rules of the U. P. A. S. I.
    (*a*) Election of Office Bearers.
    (*b*) Election of Planting Member of Council.
16. Election of Office Bearers 1916-17.

COMMITTEES.

Committee A.—General Committee of All Delegates.

Subjects Nos. 9 to 15 on Agenda.

Committee B.—Agricultural Matters.

Subject No. 6 on Agenda.

Chairman—Mr. J. A. Richardson.

Mr. C. E. Abbott.	Mr. J. H. Robinson.
,, S. H. Dennis.	,, R. Lescher.
,, E. A. Hughes.	,, C. Lake,
,, J. S. Nicolls.	,, C. H. Browne.
,, P. G. Tipping.	,, G. A. D Stuart, I.C.S.
,, A. W. Leslie.	,, R. D. Anstead.

Committee C.—Legislation.

Subject No. 8 on Agenda.

Chairman.—Hon'ble Mr. E. F. Barber.

Mr. A. J. Wright	Mr. W. H. Reed
,, A. S. Dandison	,, E. Travers-Drapes
,, R. Lescher	,, L. E. Kirwan
,, T. C. Forbes	,, A. H. Jackson
,, S. P. Eaton	,, J. B. Cook

Committee D.—Roads and Communications.

Subject No. 7 on Agenda.

Chairman.—Mr. H. Waddington

Hon'ble Mr. E. F. Barber	Mr. A. S. Dandison
Mr. J. H. Robinson	,, W. H. Reed
,, L. E. Kirwan	,, E. Travers-Drapes
,, T. C. Forbes	,, C. Lake
,, P. G. Tipping	,, A. W. Leslie
,, E. A. Hughes	,, S. P. Eaton,

Committee E.—Labour Matters.

Chairman.—C. H. Browne.

Mr. J. H. Robinson.	Mr. W. H. Reed.
,, L. E. Kirwan	,, E. Travers-Drapes.
,, T. C. Forbes.	,, C. Lake.
,, P. G. Tipping.	,, C. E. Abbott.
,, A. J. Wright.	,, H. Waddington.
,, J. S. Nicolls.	

PROGRAMME.

MONDAY, 14TH AUGUST. 10 A.M.

General Committee Meeting U. P. A. S. I.
Appointment of Committees.
Accounts.
Budget 1916-17.

MEETING OF COMMITTEE E.

2. P. M.

Secretary's Annual Report.
Chairman's Address.
Report of Labour Director.
Report of Deputy Director of Agric. Planting Districts.
Report of Planting Member of Council.

TUESDAY, 10 A.M. TO 1 P.M.

Meeting of Committee A.

2 P.M. TO 4 P.M.

Meeting of Committees B & C.

WEDNESDAY, 10 A.M.

Lectures by—

Dr. L. C. Coleman, Ph. D., Director of Agriculture, Mysore State.
Mr. W. McRae, M.A., Government Mycologist.

Agriculture.

General Discussion, Fertilisers, Pests and Diseases.

2 P.M. TO 4 P.M.

Meeting of Committee D.

THURSDAY, 10 A.M.

General Meeting of U. P. A. S. I.

The Secretary's Report.

Gentlemen,—It lies only within my province to refer to the war here as touching our industries, and to mention with acclaim the honoured names of brother planters who have joined His Majesty's Forces, adding lustre to their profession. From the planting districts of Southern India 196 men have joined His Majesty's Forces and of these seventeen have given their lives for the Empire, sixteen have been wounded and three taken prisoners. A book containing their names is on the table before each member. Those killed are as follows:—H. Robinson, I.A.R.O., killed in Mesopotamia; N. A. S. Barnard, 2nd Lieut., Liverpools, killed; G. Bromley Browne, 2nd Lieut., Black Watch, killed in France; F. M. Lowder, Corporal, Motor Cyclists, killed in France; W. B. Middleton, believed killed in East Africa; R. Thompson, 2nd Lieut., 8th R. Irish Rifles, killed in Gallipoli; L. S. Trelawney, killed at Mons; J. A. Graham, Captain, 7th Lincolns, killed in France; H. L. Robinson, Lieut., killed in Mesopotamia: E. L. Hammick, 88th Carnatic, dead; R. C. Milbank, Captain, West Kidings Regiment; died of wounds; W. Hamish Chalmers, 2nd Lieut., 19th Punjabis, killed in Persia; A. V. Cree, 2nd Lieut., Welsh Fusiliers, killed in action: J. H. Parkinson, 2nd Lieut., 8th Battalion, Lincolns, killed in action; C. Searancke, drowned in H. M. S. *Russell*; J. C. Stewart, 2nd Lieut.,

I. A. R. O. Guides, killed in action in Mesopotamia; G. R. Carson Parker, 2nd Lieut., Royal Artillery, died of wounds in Flanders. Those wounded are as follows: G. P. Farley, 2nd Lieut., I. A. R. O., now attached 57th Wilde's Rifles, Ferozepore, C. E. M. Browne, Lieut., I. A. R. O., attached 40th Pathans, wounded badly in Mesopotamia, sent home for treatment; C. Legard, Lieut., 7th Lincolns, wounded in France; I. W. Gerrard, Royal Scots; J. H. Byrne, Lce-Sergt., H. L. I. wounded in right hand in recent big battle in Mesopotamia, now discharged owing to wounds; J. Y. M. Henderson, Lieut., 11th H. L. I., slightly wounded by a sniper on 31st January, 1916, since wounded again seriously; J. D. H. Cook, 2nd Lieutenant, attached 5th Gurkhas, wounded in Dardanelles; R. Searancke, London Scottish, wounded; W. A. Fleury, 5th Royal Irish Lancers, wounded early in the war; W. G. Haslam, Capt., 10th Cheshires, wounded in France; J. Horsfall, Motor Cyclists, France, attached Signal Squadron, R. E., invalided; A. P. Kinloch, 3rd Royal Warwicks, wounded but returned to Flanders; E. C. Pitcairn, 9th Black Watch, gassed in France, invalided; E. M. Walker, attached Wellesley's Rifles, invalided Mesopotamia H. C. Davies, Royal Artillery, France, has been twice wounded; A. S. Jackson, Capt., wounded in France. Those taken prisoners are as follows:—H. Browne, 2nd Lieut., I. A. R. O., attached 24th Punjabis, Mesopotamia, captured Kut-el-Amara; W. S. Halliley, 7th Rajputs, captured Kut-el-Amara; L. Bell Syer, 27th Punjabis, captured Kut-el-Amara.

Since my last report I am glad to say that the financial situation has become considerably more easy, but the shortage of shipping has very largely increased cost of freights, and I regret that I do not see any near prospect of an appreciable reduction.

As regards the clerical work of the office, I have to report that there has been a very large increase in correspondence, due in a great measure to the work connected with the Labour Department, which I am happy to say now reaches the figure of 101,666 acres, which is 1,666 acres more than it was first decided necessary to start the Department on; and to the Rubber Growers' Association, of which we are a branch, which I have to report that 17 Companies and Estates from Southern India have joined. These together with circulars and correspondence have raised the correspondence from this office from 2,588 letters in 1912-1913 to 5,099 in 1915-1916, which in a measure shows the activity and wider influence and weight of the U. P. A., which during the course of the year has held two Committee meetings of the local branch of the Rubber Growers' Association, at which a great deal of useful information has been collected through the courtesy of Honorary Secretaries of District Associations, who have largely interested themselves in procuring it for me, and my thanks are due to them and their members. This information I hope to circulate shortly. The R. G. A. on facts being brought to their notice have allowed a rebate of 15 per cent. on subscriptions during 1917-1918 and 1919 to Companies, members of the Association, operating in Java, Sumatra, Southern India and Borneo.

Two Scientific Committee meetings were held, at which one tea and one rubber experimental station were selected and settled, and a second rubber experimental station practically arranged for. The coffee experimental station is still under consideration. The sum of Rs. 10,000 guaranteed by this Association has been placed at the disposal of the Government, who advise me that only the sanction of the Secretary of State is required for it to take over our Scientific Department.

A large and influential conference of coffee planters was held in the offices in June.

At the Madras Exhibition, our various products were exhibited and were sold by auction, which realised Rs. 342-15, which was paid over to the Madras War Fund.

The Pest Act has been accepted by the Association and it is to be hoped that Government will accept the suggestions made by the Association.

The Association accepted the report on weights and measures, but supported the minority report of Mr. A. Y. G Campbell, I. C. S.

A Chamber of Commerce for Mysore has been instituted, to which Mr. L. E. Kirwan was elected as your representative.

There was some correspondence during the year on the institution of an assessment on the profits of tea factories, but on our representation Government has issued orders for exemption.

A strong letter of protest against the imposition of a double tax on tea by the Travancore Government was addressed to Sir William Meyer, Finance Minister, but so far no decision has been given as to its withdrawal, or that an arrangement has come to between the Imperial and Travancore Governments.

The Hon'ble Mr. Barber was unanimously re-elected to represent this Association on the Legislative Council of Fort St. George and Mr. Chadwick, who has frequently attended our meetings, has gone to Russia on a mission towards which the Government invited us to subscribe, but we were unable to do so, as funds were not available. But I am able to report, through the good offices of the Planting Member, the Indian Tea Association has decided to subscribe up to £250, which decision I am sure will meet with the approbation of all South India planters.

The acreage subscribing to the Labour Department amounts to 101,666½ acres, of which the cardamom acreage is 2,010. This is an increase of 3,548 acres, the total subscription for which is Rs. 200,516-8-4.

Subscriptions and interest to the South India Planters' War Fund amount to Rs. 42,373-8-8. Except for temporary loans amounting to Rs. 450, there have been no calls on this fund, but it is after the war that the strain will be felt.

Our thanks are due to Mr. Macfarlane, who kindly consented to act in place of Mr. Guy Owen, our representative on the London Chamber of Commerce, away on military duty, for his honorary service ungrudgingly given as Treasurer in London.

The subscription to the Overseas Aircraft Fund amounted to Rs. 4,704, of which Rs. 4.649 6-9 have been remitted home.

The South Indian Planters' Benevolent Fund has Rs. 18,500 invested in 3½ per cent. Government Paper and Rs. 3,000 on Fixed Deposit. The depreciation written off on Government paper to bring value to 78 amounts to Rs. 3,410 14-11. Assistance during the year amount to Rs. 450. Report and Account to December 31st, 1915, is laid before each member.

The *Planters' Chronicle* shows a profit of Rs. 905-2-4, against an estimate of Rs. 1,000. This is due to the large rise in paper and the falling off in advertisements, due to the war.

The accounts for the year are laid on the table. A comparison of actuals with estimates shows the following results.

	Estimate.			Actual.		
	Rs.	A.	P.	Rs.	A.	P.
Income ...	...22,964	6	0	23,566	6	1
Expenditure ...	...18,827	11	0	19,267	9	6

The Chairman's Speech.

Gentlemen,—Since we last met in this room, another year of war has passed over our heads, with its awful toll of blood and treasure. Mr. Lloyd George is reported to have said quite recently, that so far as we were concerned the war was only beginning; while this is no doubt true, there are, I think, signs that the beginning of the end is in sight. In the past two years, Britain has raised an enormous army of five million men, guns and munitions are being turned out on such a scale that we are not only able to supply our own but the requirements of our Allies, who are also being aided with money. It is a wonderful record, of which the British Empire may well be proud, and should serve as an object lesson to those people who indulge in the dangerous amusement of twisting the British lion's tail mistaking its benevolent tolerance for weakness.

I do not suppose there is anyone in this room who has not had friends or relations killed or wounded in this war. Mr. Norton has read you the names of those who have gone from amongst us to fight for their country, with the list of casualties. Great as the sacrifices have been, they are likely to be greater in the future. We entered the war unwilling and unprepared, we are going to see it through. It will be a fight to a finish. It is not reasonable to expect that our industry could pass through these days of stress without feeling the strain. As regards direct taxation, probably no part of the British Empire has got off so lightly. Sir John Hewett, formerly Lieutenant-Governor of the United Provinces of Agra and Oudh, is reported to have said that while India with a population of 300 millions is spending £8 millions on her army and navy, Australia, with a population of 5 millions, is preparing to spend £50 millions a year. During the past year, tonnage has been short, at one time, owing to Government requisitionings, it promised to become acute, and although we did not get our produce shipped as soon as we should have liked, considering the nation is engaged in a struggle for its very existence, we may consider ourselves fortunate that we got it off at all.

Freights, as a natural sequence to short tonnage, have increased enormously, and there seems no reason, so long as cargo is forthcoming at the rates demanded by the shipowners, why it should not go on increasing. Coffee, with a selling value of 7*d.* or 8*d.* a lb., naturally feels the pinch more than rubber at 2*s.* 6*d.* a pound. It seems not impossible that by the time coffee crops are ready for shipment, freights will have reached 15 or 20 per cent. of the selling value. The subject is coming before you for discussion; it is a difficult one and can only be dealt with by the joint action of not only the Allies but neutrals also. It may be some consolation that 60 per cent. of the Shipping Companies' excess profits finds its way into the coffers of the Home Government, and is available for war purposes.

Tea.—The season has been favourable for crops, while prices have been well maintained; it may be said to have been a prosperous year.

Rubber.—Prices have been on the whole good, although lately there has been a fall.

I do not propose to commit myself by suggesting what yield may be expected per acre from South Indian rubber in full bearing; it is however obvious from the dividends paid by some South Indian Rubber Companies, which are not yet in full bearing, that when they are, even with a very considerable drop in prices, there will remain a good margin of profit.

Coffee.—It has been a poor year; crops were on the whole much below the average, while, owing to the markets of the Central Powers, which take a large proportion of our Indian crop, being closed, the demand was limited. Fortunately, there was a strong demand in India, which did much to save the situation. Prospects are on the whole very good for the coming crop.

I would remind you of the note of warning sounded by Mr. Richardson in his last year's address, when he pointed out the prudence of building up a reserve against the depression which is bound to come with peace, when the excessive demand created by the war ceases and before the demand for replenishing the depleted Continental stocks sets in.

Last April, H. E. Lord Pentland made a tour through the Kanan Devan, Peermade and Mundakayam Planting Districts. A full report of the tour was published in the *Madras Mail*, which no doubt you have all read.

Planters' homes and interests are usually situated in remote and somewhat inaccessible parts of the country; generally little is known of the conditions under which they and their labourers live, or the vast amount of capital and energy which have been expended in converting the wilderness into flourishing gardens, or the disabilities under which they labour; it was, therefore, with very pleasurable anticipations that the planting community looked forward to His Excellency's visit, when His Excellency would have an opportunity of acquiring first hand knowledge of planting conditions, which would help to clear away misunderstandings, which in the past may possibly have existed. Our thanks are due to His Excellency for having undertaken the tour, which, from the planting point of view, was an unqualified success.

The Association took part in the Madras Exhibition. There was a fine display of planting products. Coffee owing to the crop not having been gathered, would have made a poor display but for the fine show put up by Messrs. Pierce, Leslie and Co. It is easy to be wise after the event and I am prepared to admit we might have made a better display of our wares. Should there be another Exhibition in Madras, we must find the means to put up an attractive building of our own and appoint a Manager to receive, display, repack and return the exhibits. In short we must make a display commensurate with the importance of our industry. Our thanks are due to Mr. Martin for the great interest he took. I do not know how we should have got on without him. Also to Messrs. Parry and Co., for receiving, displaying and returning or selling the exhibits for the benefit of the War Fund.

The Labour Department has completed the second year of its life. It sustained within the short period of three months a severe blow in the death of Mr. E. H. F. Day, the Deputy Director, and Mr. C. E. L. Ward, the Superintendent at Srivilliputtur. Our sympathy goes out to their bereaved relatives. Both of these gentlemen were men of exceptional ability and energy. We may congratulate ourselves that in this crisis we had a gentleman of Mr. Martin's energy and capacity to grapple with the situation. For a time he had the onus of running these two Agencies thrown on his shoulders, in addition to his own work, and I was anxious lest his health gave way under the strain. During the past year 3,548 acres

have joined the Department bringing the total acreage to 101,666 acres. We can only hope as time goes on the planters who now hold aloof will realise the necessity of unity and the moral influence it exercises over labour.

I do not think our coolies and labour suppliers are less honest than any other class, but there are black sheep in every flock. Seeing the enormous sums of money advanced by estates in Native States to suppliers in British India, and that the only remedy against swindlers is the Civil Court, it is remarkable that our losses, which are big enough in all conscience, are not bigger. It seems to me an extraordinary thing we will not combine to put a stop to swindling. From what I have seen of the working of the South Canara Agency, which more particularly comes under my notice, I am convinced that with unity we can rope in every defaulter within the next two years.

It is a matter for regret that, owing to abnormal times, the Government of Madras has been unable to assume charge of the Scientific Department. Your Committee has not been idle, so far as this Association is concerned; everything which could be done has been done. The terms under which Government was prepared to take over the Department have been settled, and, lastly, the annual contribution of Rs.10,000 due by this Association has been placed at the disposal of Government with the Bank of Madras. Our thanks are due to the Government of Madras, and Mr Chadwick, the Director of Agriculture for the sympathy they have shown in pushing forward the scheme; that our united efforts have not reached fruition is due to the times being out of joint. The services of an Assistant Chemist have been secured for work in the Laboratory and we have been able to undertake analytical work on very moderate terms to members. Mr. Anstead will no doubt speak to you fully on this subject.

Last year, you elected a Committee to represent the South Indian Branch of the Rubber Growers' Association. At that time, I think, most of us had rather hazy notions regarding the organisation and activities of that body. During the past year two meetings of the Committee have been held at Quilon. If you have read the report of the annual meeting of the Association in London, you will find there is no matter affecting the interests and well being of rubber growers which does not receive its active and earnest attention, whether it be the drafting of a forward contract form, whereby the producers' interests are safeguarded, or seeking redress against the unjust application of the excess profits tax on young estates. The Ceylon and Malaya Research Funds have been amalgamated with the R. G. A.; the result of their labours is available to subscribers; the question of research work in South India is a matter of correspondence between Mr. Anstead and the London Office.

I do not think it is too much to say that the R. G. A. is an indispensable body to rubber growers: subscribers and non-subscribers alike benefit by its labours. It is incumbent on every estate to join. I do not believe it is the wish of shareholders in Companies, or proprietors of estates, to derive benefit from a body maintained at the expense of their neighbours.

The question of alien enemies and the treatment they should receive after the war, will come up for discussion. It is unthinkable that members of a nation, guilty of the atrocities perpetrated in Belgium, the starving and ill-treatment of our soldiers and civilians who are prisoners in their hands, the murder of Miss Cavell and Captain Fryatt, shall be accorded the same treatment as our gallent Allies.

The question of the double duty on Travancore tea will come up for discussion. I feel confident that as a mere matter of bare justice an arrangement will be come to by the Governments of India and Travancore, which will put Travancore teas on the same footing as other Indian teas.

The draft Pest Act submitted by the Government of Madras for our opinion was accepted as it stood.

The Planters' War Fund inaugurated last August, the result of Mr. Murphy's memorable speech, has been well supported on the whole. I hope subscriptions will not fall off. We shall want every anna we can get. So far, calls on the fund have been small ; we did not expect anything else, and it is when the war is over, when our men are discharged, without money or billets, some maimed for life, possibly, incapable of maintaining themselves and with only a soldier's wound pension, that we, who from circumstances have remained behind, must not forget the debt we owe these gallant fellows.

The Planters' Aeroplane Fund, owing doubtless to a feeling that the War Fund had a prior claim, did not realise as much as we should have liked ; nevertheless, we were able to send a respectable sum to the Overseas Aircraft Fund.

Owing to the fall in value of Government securities, in which our money is invested, the reserve of the Benevolent Fund is less than last year, notwithstanding that last year's appeal met with a good response, which I trust will be maintained this year.

In thanking the Hon'ble Mr Barber for the great help he has accorded me during the past year, I take the opportunity of congratulating him on his re-election as Planting Member on the Madras Legislative Council, and if I was not confident that everyone has already done so, I should think it a suitable occasion to doubly congratulate ourselves that Mr. [illegible] has been secured to represent us. Few of us, I fear, realise, I certainly did not until I was brought into closer touch with him and his work, the extent of the obligation we are under to him for his whole-hearted and unselfish labours for the welfare of the community. I think the members of the Council and the several Committees, Mr. Anstead and Mr. Martin for the kind assistance they have given me. I am much indebted to our Secretary, Mr Norton, for his loyal support.

The *Madras Mail* has during the year maintained its interest in planting matters, as in the past, and as, I trust, it will in the future, and claims our thanks.

The year's accounts are on the table and have been passed by your Auditors, Messrs. Fraser and Ross. The result may be considered satisfactory. Expenditure slightly exceeded the estimate, but this was more than counterbalanced by the actual excess in income.

During the past year we have had to record the death of several well known planters, amongst them Mr. A. B. Boyd and Mr. H G Bonner, both of Mysore, Mr. P. Guard of the Wynaad, and Mr. C. Grey, of the Nilgiris. We tender our sympathy to those left behind. We all heard with much regret of the sudden death of Mr. Harry Ormerod, who was for 15 years Secretary of the U. P. A. S. I. He always devoted himself heartily to the interests of the Association. I am sure all present will agree with me in expressing our sympathy with his widow and his son in their great loss.

We are glad to welcome at this meeting the Hon'ble Mr. Cobb, British Resident in Mysore and Chief Commissioner of Coorg, who

has already shown that he takes a keen interest in planting matters, by his gracious attendance at the conference of coffee planters held in Bangalore on the 5th June last. We also welcome Sir Thomas Holland, the Chairman of the Industries Commission, which, though it is not going to embrace agriculture among its deliberations, yet must discuss matters which interest this Association, since nearly all Industries in India are ultimately dependent on agriculture or agricultural products. We are also glad to see the Dewan Saheb and Mr. Bannerjee, the 2nd Councillor of the Mysore State, the Director of Agriculture, Madras and the numerous visitors.

We are living in terrible times. Possibly the worst is before us, we are a determined and united nation, and whatever sacrifices have to be made, will be made willingly, and we are cheered by the knowledge that victory is certain.

Annual Report of the Deputy Director of Agriculture, Planting Districts.

1st July 1915 to 30th June, 1916.

Mr. Chairman and Gentlemen,—I have the honour to present to you my Seventh Annual Report. It takes the usual form, being a summary of the work done by the Scientific Department during the year under review, detailed discussion of pests, diseases, manures, &c., are left to be dealt with under their separate headings on the Agenda paper at the Annual Meeting.

Office and Correspondence.

My office staff throughout the year has consisted as heretofore of one Writer and one Peon, and the upkeep of this staff was met, as in former years, by a contribution from the Government of Madras.

The Government of Madras in their Order No. 276 Misc. Rev. dated 8th February 1916 altered my designation of Planting Expert into that of Deputy Director of Agriculture, Planting Districts.

Office work has as usual been heavy and it continues to absorb the majority of my time when I am at headquarters. 1113 letters were received and 917 written during the period under review, these being by far the highest figures yet recorded for correspondence in my office, thus showing that this part of the work is annually increasing.

A record has been kept of the number of planters and others who have called at my office to consult me during the year; it amounts to 110. In addition to this I have met while on tour 139 planters.

Publications.

I have as usual contributed regularly to the pages of the *Planters' Chronicle* and have written, during the period under review, 80 articles, Notes, &c., comprising 125 pages of that Journal. In addition to this I have maintained since May 1916, at the suggestion of the Chairman, a regular weekly article dealing with Markets, Prices, and Statistics which it is hoped has proved of interest to planters.

By special request I wrote a Note on Soil Erosion for the Board of Agriculture, and a Note on Green Dressings in Planting Districts for Mr. Dobbs, Officiating Imperial Agriculturalist, which he published in his Bulletin on Green Manuring in India produced at the end of the year.

Tours.

During the year I have done a great deal of touring, being absent from Head Quarters for 145 days. The following Districts have been visited in the order named, the Nilgiris and Nilgiri Wynaad, South Mysore, Malabar and Peermade. North Mysore, the Anamallais. In the course of these tours I visited as many estates as possible, and attended several meetings of planters and delivered lectures. I attended College Day and the Agricultural Conference held at the Agricultural College, Coimbatore, in July 1915, on which occasion the proceedings were presided over by the Planting Member of Council ; two Meetings of the U. P. A. Scientific Committee and South Indian Rubber Growers' Association held at Ootacamund and Quilon respectively; I paid one visit to Madras to consult the Director of Agriculture, and a visit to Coimbatore to consult the Library and discuss work which is being carried out in co-operation with the Government Mycologist. I also paid a visit of inspection to the Government Cinchona Gardens at the request of Government, and took the opportunity to inspect the Coffee Hybridisation Experiment Plot and met there two Nilgiri planters who were kind enough to advise me in the matter of its cultivation. Finally I attended a Meeting of the Board of Agriculture held at Pusa in February 1916. These tours have necessitated my travelling a distance of 3185, miles by road and 3427 miles by rail.

Mr. G. N. Frattini continues to hold the post of Scientific Assistant for Mysore. As pointed out in my last Annual Report the system of dual control over his work is unsatisfactory and it has led to friction. I trust that this dual system will be changed and Mr. Frattini either placed wholly under my Department or withdrawn from it altogether. The existing state of affairs is unpractical and indeed impossible.

Experimental Work.

The effect of the European war has naturally been felt by the planting community. Estates are short handed and unwilling to undertake much experimental work owing to the lack of supervision to give to it. The prices of manures have risen all round and many fertilisers usually depended on have been unobtainable or only obtainable at very high prices. Prices of our products have on the whole been favourable, but freights have increased and the difficulties of shipping have at times been considerable.

Coffee.—A good deal of work has been done on the Spraying of Coffee both for Green Bug and with Bordeaux Mixture as a protection against the attacks of Leaf Disease and Black Rot, and our knowledge has been considerably advanced.

Manurial Experiments have been continued, but owing to the overwhelming effect of early rains and climate generally on the yield of Coffee such experiments will have to be continued over a long period of years before they will yield any results from which deductions can be made.

An ever increasing amount of advice is asked for as to the manuring of this crop, and the introduction of manurial systems based on a preliminary soil analysis and spread over a number of years is growing in favour. Where such systems have been adopted and continued over three to five years the results are most favourable.

On June 5th a Conference of Coffee Planters was held at Bangalore under the auspices of the Scientific Department at which Spraying, Manuring, and the selection of seed and hybrids were discussed. Twenty-six Coffee Planters were present representing six districts. The Hon'ble Mr. Cobb,

the Mysore Resident, was good enough to honour us with his presence, and Mr. McRae the Government Mycologist was also present. Dr. Coleman very kindly read a paper and took a leading part in the discussion. Judging from the number of planters who attended this Conference and the lively correspondence which has arisen out of it in the pages of the *Planters' Chronicle* it may be considered to have been a success and I hope to arrange during the coming year for similar Conferences of Tea and Rubber planters respectively.

Tea.—A leaf disease of Tea due to *Colletotrichium camelliae*, popularly known as "Brown Blight," has come into prominence during the year and has caused a considerable amount of damage on many estates, especially in nurseries.

This matter was investigated by the Government Mycologist and myself in the Nilgiri Wynaad and certain recommendations for its control were published. I am glad to be able to state that the methods thus advised have proved successful, especially in the case of nurseries. While on tour I have had several opportunities of inspecting nurseries which were badly attacked by this fungus which after spraying with Bordeaux Mixture had completely thrown it off and recovered their health and vigour.

Tea Manuring has occupied my close attention and I think I may say that we have now acquired knowledge which enables us to recommend a general manuring system for this crop in at least one District which gives very favourable results.

Rubber.—The series of manurial experiments at Kerala have been continued and the results of two years work have been published in the *Chronicle*. The work is being continued and a series of tapping experiments has also been laid down.

One of the most serious diseases of Rubber with which we have to contend is the Abnormal Leaf-fall. This has been investigated by the Government Mycologist who has succeeded in proving the cause of the disease and has done much to throw light on the whole matter. I should like to take this opportunity of tendering the thanks of my Department to Mr. McRae for the energy he has displayed in this matter and for the valuable assistance he has afforded us.

I am happy to say that a South Indian Branch of the Rubber Growers' Association has now been formed. Two Meetings were held during the year and much preliminary work done. I would venture to suggest that the Association might publish a small handbook dealing with the Rubber industry of South India, showing the acreage under cultivation, the age of the trees, the yields obtained from trees of different age, and the cost of production. I feel sure that such a book would be of great value and if laid before any Rubber Exhibition held in the future in England or elsewhere would go far to bring the South Indian Industry before the public. When present at the Rubber Exhibition held in London in 1914 I was struck by the ignorance displayed as to the size of the industry here.

Laboratory.

A special Report on the working of the analytical branch of the Scientific Department has been laid before the Finance Committee and I do not propose now to go into details about it. Suffice it to say that after a number of preliminary unforseen difficulties had been overcome an Assistant Chemist was finally appointed in December 1915 who has carried out his duties in an entirely satisfactory way, 20 Soil samples and 59 samples of fertilisers have been analysed during the period under review and the sum

of Rs. 744 has been earned in fees. The success of this branch of the Department entirely depends on the amount of work sent in, and I would ask planters to take advantage of the facilities now offered them and to send in samples enough to keep the Assistant Chemist employed and make the venture a financial success. The scale of fees has been purposely made low, perhaps too low, and it is only by working full time that we can possibly cover our expenditure.

THE SCIENTIFIC DEPARTMENT.

The reorganisation of the Scientific Department has been advanced another stage during the year, but War conditions are necessarily holding the matter up. The terms offered by the Government of Madras in their Order No. 726 Revenue dated 30th March 1916 have been accepted by the U. P. A. S. I., and the first contribution of Rs. 10,000 has been placed to the credit of Government. We now await the sanction of the Secretary of State to commence operations.

It is proposed to open in the first place four Experiment Stations, two for Rubber, one for Tea, and one for Coffee. In anticipation of the sanction of the scheme by the Secretary of State, and in order to waste no time when this sanction is obtained, preliminary work has been begun. The site of the first Rubber Experiment Station has been decided on at Mooply Valley, the land has been chosen and details discussed with the Directors of the Company who have been good enough to offer the land; these have been agreed to and the transfer sanctioned by the Directors. The second Rubber Experiment Station is to be situated in South Travancore and suitable land has been promised though the actual site has not yet been decided upon. The first Tea Experiment Station is to be situated in Peermade and the site has been chosen and this may be considered settled. The site of the first Coffee Experiment Station has not yet been agreed upon. The Santikoppa District in Coorg has been suggested, but no suitable land has as yet been offered.

I am happy to report that my Department continues to work in close co-operation with the Mysore Agricultural Department in all matters which concern both Departments, and they are many. My hearty thanks are due to Dr. Coleman, the Director of Agriculture, Mysore for much friendly advice and help always wholeheartedly and delightfully given and I look forward in the future, when our Department is reorganised and established on a firm basis with Experiment Stations of our own, to working much more closely with the Mysore Agricultural Department for our mutual benefit and that of planters generally.

RUDOLPH. D. ANSTEAD,
Deputy Director of Agriculture, Planting Districts.

The Planting Member.

The Hon'ble Mr. E. F. Barber said :—

Before saying anything about the work that has come my way, I wish to thank you very sincerely, gentlemen, for the honour you have done me in re-electing me as your representative on the Legislative Council. I have during the past three years found great pleasure in the work and this has been due to the assistance I have had from the Chairman of the Association and from others with whom I have been brought in contact during this time. It is pretty certain that nothing can be done

without assistance in these matters, and if it be so fortunate that, in your opinion, anything has been achieved, your first thanks are due to those gentlemen who have given their time and experience, in order to serve you as Chairman. It is a pleasure to me that three of them, Mr. Abbott, Mr. Richardson and our present Chairman, Mr. Browne, are all here to enable me to tender my thanks. At the last meeting, resolutions were passed regarding the Cochin Harbour and Railways in Planting Districts. I take them together as they are interdependent. The railway referred to (the Manantoddy Shoranur Railway) could not come into existence unless there were a harbour, while a harbour such as Cochin may be cannot well do without improved railway services to feed it. Within a few weeks of these resolutions being passed, the Hon'ble Sir Harold Stuart, accompanied by the Hon'ble Mr. S. B. Murray, visited the Wynaad, with a view to learning at first hand the possibilities of the project, while a little later, the Hon'ble Mr. S. B. Murray made a more detailed inspection of the country, including the ghaut section. Whether these projects will mature rapidly is a question of circumstances, whether they will mature at all will depend upon you, and the consistency with which you press your needs and claims. Mr. Richards, I see, is here to-day, and I do not know if he is in a position to make any utterance which will cheer your enthusiasm, or whether he would prefer to remain silent until times are more reassuring and promise better for constructional works. During last year's debate on these matters, a point insisted on was that we need a market, and we know that a port is necessary for such a market to spring into existence, a port that can distribute our produce to all parts of the world, a port on which we can concentrate our produce by easy communications. We who earn our livings in the hinterland of the West Coast are convinced where that market should be and how it should be connected with us. Perhaps Sir Thomas Holland will agree with our convictions; if he does, all the better, if he doesn't, well, we won't agree with him, and will go on striving in our own way for what we want.

Apart from the interest in the particular matter in hand, Sir Haro'd Stuart's visit was of interest to the South Mysore Association and the advocates of the Arsikere Mangalore Railway, in that he made public the view that the Madras Government had taken on this matter, and showed how ready they had been to give the undertaking required by the Mysore Government. The other railway project on hand is the extension of the Cochin State Forest Tram line into the Anamallais. The scheme has been put forward by the Dewan, and I am glad to say that it has the approval of the Government. While so near the question of commerce, I might refer to the Madras Commercial Mission to Russia, which has been sent under the auspices of the Government of Madras and under the control of an old friend of ours, Mr. Chadwick, the Director of Agriculture. We were asked to contribute to this, but, as you are aware, our funds would not permit of this. Thanks, however, to the views taken by the Indian Tea Cess Committee on this matter, we are not left seemingly to stand as lookers on, while others bear all the expense, for the Committee are making the contribution from their funds which we could not make.

I hope the Commercial Mission will be a great success, but I feel that had we the market we hope for now, the probable results, from our point of view, would be better. If Mr. Chadwick, when showing an attractive sample of South Indian tea to some Russian buyer, could only say that an unlimited quantity of similar tea could be bought at Cochin, where shipping facilities were of the best, how nice it would be! This promised contribution is not

the only interest the Indian Tea Cess Committee have taken in South India, the active pushing and advertising of tea as a beverage in the South has begun. I have not come across their activities yet myself, but from what I have heard of the tea booth at the Tiruppur Cattle Show, there is little doubt that the enterprise offers every chance of success.

In the matter of legislation I have very little to say. Some of the provisions of Act I have been called in question, and the districts concerned have expressed their views on the points raised. The West Coast Association brought up the Factory Act and its relation to rubber factories. This was particularly in regard to the Cochin Ordinance, but it raised the question as to whether we should ask to have rubber factories exempted as tea, coffee, and indigo factories are exempted, in the British Act. Some consternation was raised by an order of the Board of Revenue, that income tax was leviable on the profits of tea factories using machinery. This matter which affected the British District only is happily settled. Travancore has had its own special scare in the shape of a double export duty on tea, and this has been a subject of considerable correspondence and many interviews. A memorial was addressed by the Association, through the Government of Madras, to the Hon'ble Sir William Meyer, and he may have just received this. Any way, the subject is still under discussion between the Governments of Madras and Travancore, and a satisfactory settlement of the Travancore Planters' disability is certain. During last April, H. E. the Governor of Madras paid a visit to the Travancore Planting Districts, and I think the thanks of the whole community are due to His Excellency for this happy innovation. It is ages since the planter was looked upon officially as a kind of political outcast; no longer will you hear an official say that the country would be better off without him. Still the extent of our activities is not generally recognised, and it is well for us that the head of the Madras Government has taken the trouble to find out for himself exactly what we are, and how and where we live. As producers of what the world wants we hold a position in the economical world that cannot be gainsaid. Our work is useful and we are not depredators on society at large, for our depredations appear to be confined to pinching each other's coolies, or perhaps enticing away some promising young Superintendent for work elsewhere. I hope, as one result, His Excellency's visit may lead to the even treatment of planters in South India, whatever be the Government under which they live, and I think a policy, with this end in view, is one that should be pursued by this United Association.

In regard to the extended scope of the Scientific Department, I am able to say that the matter has been referred back by the Government of India to the Government of Madras, with some suggestions regarding the scheme. These suggestions are purely matters of detail, and in no way impair the utility of the schemes, in fact, rather the reverse, so there is no need for these to be referred to the Association, for they can be better left for settlement by Government, without any action on our part.

There are other matters, to which I need not refer now, since they appear on the agenda paper, but there is one more on which I should like to say a few words. St. George's Home is a matter which might perhaps be considered outside the scope of my work. I should have said so myself a year ago, but now I find that it is a problem of deep political significance and one which, because we are men of the race we are, we too must help to solve. Mr. Breeden is here to speak of his work himself, and I can assure you you will find him far less wearisome than I have been.

The Planters' Chronicle.

RECOGNISED AS THE OFFICIAL ORGAN OF THE U. P. A. S. I., INCORPORATED.

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THE U. P. A. S. I.

(INCORPORATED.)

Contents.

We publish the proceedings of a well attended Annual General Meeting of the Kanan Devan Planters' Association at which many important subjects were discussed.

We also publish the proceedings of a Committee Meeting of the Shevaroy Planters' Association.

We publish three pages of a Memo. of Resolutions passed at the Annual General Meeting of the U. P. A. S. I.

We would specially draw the attention of our readers to Resolution XVIII which reads "That this Association while approving of Mr. Wood's design, is anxious that other designs should be submitted before making a definite choice, and members of the Planting Community are specially invited to submit designs." We trust that members, artistically endowed will send in designs for a cover for the *Chronicle*.

R. D. A. furnishes us with his weekly article on Markets, Prices and Statistics.

We would allude with great pleasure to the very pleasant Dinner and Dance given to the United Planters' Association of Southern India by the Management of Messrs. Spencer's West End Hotel. It was a most enjoyable function and a compliment highly appreciated by the members of this Association and their friends, and fittingly concluded, what, on all sides, was considered to be the most satisfactory Annual Meeting.

SOUTH INDIA PLANTERS' WAR FUND.

	Rs.	A.	P.
Amount previously acknowledged	46,289	12	8
Mr. N. D. Pollock	30	0	0
Mr. A. H. Robb	30	0	0
Mr. H. Pilkington	75	0	0
Messrs. Aspinwall & Co.	250	0	0
Mr. R. H. Crowther	10	0	0
Total...	46,684	12	8

DISTRICT PLANTERS' ASSOCIATIONS

Kanan Devan Planters' Association.

Proceedings of the Annual General Meeting held in the High Range Club, Munnar, on Saturday, June 24th, 1916, at 3 p.m.

PRESENT.—Messrs. C. Fraser, (in the Chair), W. A. Lee, H. L. Pinches, J. M. Bridgman, J. S. Hawkins, J. C. Swayne, L. H. Ley, J. S. B. Wallace, C. Rowson, A. Hall, A. H. Dixon, G. R. Strachan, A. Yates, W. O. Milne, A. J. Wright, J. B. Ingram, E. H. Francis, E. L. Koechlin, A. Blair-Hill, G. Walker by his Proxy E. A. Hughes (2), and E. A. Hughes, (Honorary Secretary).

The notice calling the Meeting was then read and the minutes of the Extraordinary General Meeting held on the 12th February, 1916, were read and confirmed.

The Chairman on opening the Meeting said:

Gentlemen, before commencing business I would like to move the following Resolution:—

"That the Members of the K. D. P. A. have learned with profound sorrow of the sudden and tragic death of Field-marshal Earl Kitchener and desire to place on record this expression of their deep sense of the irreparable loss which the British Empire has sustained in being deprived of a great Military Personality at this critical time and that this Association mourns with the Empire the great loss it has suffered."

The Resolution was carried, all standing.

A letter of apology from Mr. A. W. John was read, regretting his inability to attend.

The following Agenda was laid on the table:—

1 Chairman's Speech.
2 Honorary Secretary's Report
3 Accounts
4 Labour Laws
5 Post Offices
6 Election of Planting Member
7 The Madura-Bodinayakanur Railway
8 Scientific Officer
9 The Lady Ampthill Nursing Institute
10 Sri Mulam Delegate's Report
11 T. C. P. A. Do
12 Bangalore Delegate
13 Timber values
14 The Madras War Fund (Hospital Ship)
15 Export Duty on Tea
16 Game Laws
17 The U. P. A. S. I. Agenda
18 Correspondence
19 Election of Office-bearers

The Chairman said, " There is a very long Agenda before us and I do not intend to detain you by making a lengthy speech. It is a great pleasure to see so many Members present and I am glad to note the interest they all take in the work of the Association." He would ask their permission to change the position of the items 1 and 2 on the Agenda so that after hearing the Honorary Secretary's Report he would make any remarks that he might think necessary ; this was agreed to unanimously.

HONORARY SECRETARY'S REPORT.

MR. CHAIRMAN AND GENTLEMEN,

I beg to lay before you my report for the past year. For six months of the period under review I was on leave at Home and my position was most ably and effectually filled by Mr. G. A. Holden who carried on the work of the Association thoroughly and successfully.

During the year, the Bi-Annual Meeting, one Extraordinary General Meeting and eight Committee Meetings have been held and I am glad to say all were well attended.

There are at present 35 Members on the Register as against 36, the Company's Labour Department having ceased to exist.

I am pleased to be able to state that our financial position is a strong one, the year closing with a credit balance of Rs. 1,000 odd.

ACREAGE, ETC.—There are now 20,602·37 acres under Tea ; 993·75 Coffee ; 824·50 Cardamoms ; 850 Rubber ; 429·25 Cinchona and 379 Sisal. All are doing well and extensions especially of tea are being continued. The total crop for the year was 9,979,871 lbs. as against 8,803,031 last year. The average yield per acre of the mature area was 596 lbs. as against 580 lbs. last year. The average price obtained was 11·03*d* as against 8·93*d* last year. This is accounted for largely by the War and the advantage gained will have been heavily discounted by increased freight charges, etc. The market at present is steady and well maintained though the recently imposed export duties, as also heavy freights, etc., will absorb most of the gain in price.

MEDICAL GRANTS from His Highness' Government have been regularly paid and the Association is very grateful for this consideration and help. I think, seeing the recent export duty imposed by the Government, they might be again requested to increase these grants, as the benefit obtained by more efficient Medical Effort will not only benefit Government indirectly but also ourselves.

POSTAL SERVICE has been carried on fairly satisfactorily, but I regret to say there have been a good many complaints, some of which will doubtlessly be taken up during the Meeting.

SCIENTIFIC OFFICER.—There is some question as to whether Mr. Anstead should be asked to repeat his visit to these Hills during the coming year. This will be decided by the Meeting.

GAME LAWS.—The question of Game Laws will again be brought up and discussed, for it is a matter of extreme regret that, in spite of all our efforts, things are in a most unsatisfactory condition and from the report of the Game Committee's Secretary you will notice Government appear to have taken very little interest, or rendered any effectual help.

THE L. A. N. I.—The Association had paid its subscription up to-date and it is a question for the Meeting to decide as to its continuance to do so. I think I am right in saying that many Members have very highly appreciated and benefited from the services of Nurses.

SRI MULAM DELEGATE.—Mr. A. J. Wright was again our Representative at the Sri Mulam Popular Assembly and took things in hand in his usual, thorough and capable way. I shall have the pleasure of reading his report later. He also attended as our Delegate at the T. C. P. A. Meeting and his report will also be read before the Meeting.

ACCOUNTS.—The Balance Sheet and Books of the Association are on the table and any Members may scrutinise them, who wish to do so. I trust later they will be passed and approved and I shall have the pleasure of proposing a hearty vote of thanks to Mr. J. B. Ingram for kindly auditing them.

THE S. I. P. B. FUND.—I trust this will continue to receive the kindly support of all our Members. It has made allowances to some of our own Friends and helped deserving Planters in distressed circumstances.

LABOUR LAWS have worked satisfactorily, but there are one or two points to be brought forward for discussion and settlement.

BANGALORE DELEGATES.—Messrs. Wright and Lee were our Representatives at the last Meeting. Their report has been printed and circulated and was read at the Bi-Annual Meeting. I think we owe them a hearty vote of thanks for the thorough way in which they attended to our interests.

THE NEW LABOUR DEPARTMENT is working well and I feel sure that we all are receiving great benefits from its untiring service. It has been very hard hit during the year by the sad and heavy loss of two of its most efficient Members, Messrs. Day and Ward.

ROADS AND COMMUNICATIONS.—Considerable, liberal grants have been made by the Government for maintaining the old and opening several new roads. I am sure we are all very grateful for their help in this direction. I am afraid we shall have to wait for some time longer for the long-desired Railway communication between Madura and Bodi. This is due to several causes, the War of course being the chief and increased cost of rolling stock, permanent way, etc., as also the difficulty of obtaining financial assistance.

H. E. THE GOVERNOR'S VISIT.—I haye to place on record the honour and pleasure we all felt at the recent visit of His Excellency Lord Pentland. I am sure the visit will result in great mutual benefit. The Government has seen us under actual working conditions and will be able to more fully realise our position and more sympathetically help us when we approach them in various ways.

The mighty struggle of the Nations continues with increased intensity. We live here disturbed by the merest ripples from the great storm that is raging. Some of our Members have given up their lives in the service of our King and Country; many others are enjoying the honour of actively serving. More of us doubtless would also like to get to the Front, but in doing our duty here we are rendering as great service to the National Interests as if we were actually fighting.

The Chairman on rising said, I feel I cannot let this occasion pass without expressing our great appreciation of the honour done to the Association by His Excellency's visit to the District. That visit would mark a red letter year in the Association's history. His Excellency very kindly consented to meet the Committee who were presented to him, and to discuss a few important subjects. His attitude was most kindly and sympathetic. We have reason to feel assured that his visit will be of the utmost benefit to the Association and District as a whole. He would ask the Members to pass a hearty vote of thanks to Lord Pentland for his kindness and courtesy in receiving the Members of its Committee. This was carried unanimously.

After having heard Mr. Hughes' full and detailed report, there is little further left for me to say. It is worthy of note that the area under tea has considerably increased, as also the yield per acre and that prices have been most satisfactory. He would like to congratulate the staff of the K. D. H. P. and A. A. D. T. T. Companies on the very successful results attained.

The accounts and books are on the table before you and I am glad to note the financial position is so satisfactory.

It is a matter for regret that the Postal Service has not been quite satisfactory and the Association would represent the matter to Government if Members would supply the Honorary Secretary with specific instances of delays and unsatisfactory working.

I am very pleased to note that the question of Game Preservation is still receiving attention. For some reason His Highness' Government does not appear to have officially recognised the Association's Game Committee, and representations will be made asking that this shall be done. The wanton and illegal destruction of game is at present most deplorable and steps should be taken to have this checked with as little delay as possible.

The Association will be asked to continue its subscription to the L. A. N. I. Many Members have received great benefit from the services of its Nurses and I trust this excellent Institution will continue to receive your support.

In connection with the recently imposed double duty on Tea, I may say that the matter has been strongly represented through the U. P. A. S. I. to Government, and I hope shortly to hear that our requests in the matter have been acceded to.

The question of the Government's new ruling with reference to timber values will come before you and you will be asked to confirm the Resolution passed by your Committee on the matter.

I would remind you of the S. I. P. B. Fund and would ask you all to continue your kind support to it. I know that all of you are subscribing liberally to many various War Funds, but I trust the Benevolent Fund will not escape your notice and kind sympathy. It is worthy of all support and has done and is doing most excellent work in the interest of the Planting Community.

As I have no doubt you all wish to get on with the Agenda, I will not detain you longer, but before sitting down I would ask you to pass a very hearty vote of thanks to Mr. Hughes for the work he has done for us during

the past 6 months. Mr. Holden acted for Mr. Hughes during the time he was at Home and we have placed on record our thanks to him for his efficient work.—This was agreed to unanimously.

ACCOUNTS.—The Honorary Secretary then read a statement of the accounts and the balance sheet to the Meeting. The Chairman proposed that they be approved and adopted.—Carried unanimously. The Honorary Secretary proposed a vote of thanks to Mr. J. B. Ingram for his kindness in auditing the accounts.—Carried unanimously.

Mr. H. L. Pinches moved a vote of thanks to the Chairman for his kind reference to the Staff of the K. D. H. P. and A. A. D. T. T. Companies.—Carried unanimously.

LABOUR LAWS.—The Chairman then read the following Resolution with regard to the alteration of the preseent Labour Rules.

"That Rules 10 and 11 should be attached to Rule No. 3 as sub-clauses."

This was proposed by Mr. W. O. Milne and seconded by Mr. W. A. Lee. After some discussion the alteration *was agreed to unanimously.*

POST OFFICES.—The Chairman then read the following Resolution with reference to Post Offices:—

> "that Government be again asked to establish direct communication by Runners between Devicolam Cutchery and Surianalle Post Offices, as at present it takes fully two days for letters to be delivered over a distance of 10 miles."

This was proposed by Mr. J. S. Hawkins and seconded by Mr. G. Walker's proxy.—Carried unanimously.

The Chairman then said that "several complaints have been made with regard to local working of the Post Offices. It was impossible for the Association to take the matter up in a general way, but if Members would furnish the Honorary Secretary with specific instances of complaints he would approach the Government in the matter.

ELECTION OF PLANTING MEMBER.—The balloting for the Planting Member was then carried out after the Honorary Secretary had read the Rules with reference to the same to the Meeting. The Hon'ble E. F. Barber, received the unanimous vote of Members present.

THE MADURA-BODINAYAKANUR RAILWAY.—The Chairman then asked Mr. H. L. Pinches if he could give the Meeting any further information with regard to the above Railway. Mr. H. L. Pinches explained that nothing further had been done, but the matter was being attended to and the work would doubtless be taken in hand as soon as practicable.

SCIENTIFIC OFFICER.—The Chairman then read the following Resolution:—

> "that this Association will welcome a visit from the Deputy Director of Agriculture, Planting Districts if he can spare the time for it during the coming year."

Proposed by Mr. A. J. Wright and seconded by Mr. A. Yates and carried unanimously.

THE L. A. N. I.—The Chairman then proposed that the Association continue its subscription to the above institute. He felt sure that all Members fully recognize the great value of this Institute and many present had benefited from the kindness and help of its Nursing Staff—This was agreed to unanimously.

SRI MULAM DELEGATE'S REPORT.—Mr. A. J. Wright then read his report on the proceedings of the Sri Mulam Popular Assembly. A vote of thanks was proposed by Mr. H. L. Pinches and seconded by Mr. W. A. Lee to Mr. Wright for his work and interesting report—Carried unanimously.

T. C. P. A. DELEGATE'S REPORT.—Mr. Wright also read his report on the T. C. P. A. Meeting. The Meeting unanimously passed a vote of thanks, proposed by the Chair, to Mr. Wright for his work in this connection also.

BANGALORE DELEGATES.—The Chairman proposed that the Honorary Secretary (Mr. Hughes) and Mr. H. L. Pinches be elected as the Association's Delegates at the coming U. P. A. S. I. Meeting. It was doubtful whether Mr. Pinches would be able to attend and in the event of his not being able to do so, he proposed Mr. A. J. Wright accompany Mr. Hughes.—This was agreed to unanimously.

TIMBER VALUES.—After readiug a letter from the C. T. P. A. with reference to the above the Meeting unanimously decided to support the C. T. P. A's Resolution.

THE MADRAS WAR FUND. ("HOSPITALSHIP")The Chairman proposed that the Association pay a donation of Rs. 250 towards the Madras Hospitalship "Madras." Ater some discussion the Honorary Secretary was asked to write to the various Interests concerned in the Association and obtain their consent before doing so.

EXPORT DUTY ON TEA.—The Chairman then read the following Resolution passed by the Committee with reference to the recent Export Duty on Tea :—

> "that this Association requests the U. P. A. S. I. to prepare and forward a Memorial to Sir W. Meyer through the Government of Madras on behalf of the K. D. P. A. on the lines laid down in the Hon'ble E. F. Barber's letter of 25th April, 1916, which letter has the cordial support and approval of this Association."

This was *agreed to unanimously*. The Chairman then read the following Resolution :—

> "That this Association regrets the position taken up by His Highness' Government with regard to the duties on tea exported from Travancore for consumption in British India which amounts to raising a fiscal or land-barrier. It is understood that the intention has always been that Export or Import duties should be collected only at ports."—Agreed to unanimously.

GAME LAWS.—The Chairman then said that he had the following Resolution to propose with regard to the above. The illegal destruction of game was a very serious matter indeed and he knew every Member of the Association was interested and wished to have it stopped as soon as possible. The Association's Local Game Committee were powerless to act until they received official recognition and the sanction of His Highness' Government to do so.

> "That this Association requests His Highness' Government to recognise the Association's Game Committee under the new Game Regulations and to appoint it to act under the Regulations; and that the names of the Committee be submitted to Government."

Proposed by Mr. A. J. Wright, seconded by Mr. Walker's proxy and carried unanimously.

THE U. P. A. S. I. Agenda.—The Preliminary Draft Agenda of the U. P. A. S. I. Meeting was then read and the following Resolution was proposed by Mr. Wright and seconded by Mr. W. A. Lee.

> "That this Association requests the U. P. A. S. I. to place on the Agenda of the Annual General Meeting, the following:
>
> Mercantile Shipping Tonnage."—This was agreed to unanimously.

Before resigning the Chair, Mr. Fraser asked the Association to pass a hearty vote of thanks to Mr. Hughes for the work he had done for the Association generally. The running of the Association business entailed a very considerable expenditure of time and he was sure all agreed that Mr. Hughes had fulfilled his duties in a most thorough, careful and satisfactory manner. A vote of thanks was passed unanimously.

Mr. Hughes thanking the Meeting for their hearty and kindly appreciation of his work, said, it was a great pleasure, as he took the keenest interest in the well-being of the Association. He was extremely gratified that his efforts met with their thorough approval.

On resigning, the Chairman begged to thank the Honorary Secretary and Members of the Committee for the thorough way in which they had supported him during the past year. He had now acted as their Chairman for some years and had always met with the kindly and sympathetic support of every Member of the Association and this has rendered his work easy and made it a pleasure to act for them.

The other Members of the Executive having resigned, Mr. H. L. Pinches was temporarily voted to the Chair. He asked the Members of the Association to give Mr. Fraser a very hearty vote of thanks for all the work he had done for them. In spite of the very long distance he had to come, Mr. Fraser had regularly attended their Meetings and taken the keenest interest in the work of the Association. He felt it was due to Mr. Fraser's efforts that the Association had made such good progress.—Carried unanimously.

ELECTION OF OFFICE-BEARERS for the ensuing year then took place. Mr. J. C. Abbott was elected to the Chair and Mr. E. A. Hughes was re-elected as Honorary Secretary. The voting for the Committee resulted in the election of Messrs. H. L. Pinches, A. J. Wright, A. Yates, J. M. Bridgman, and W. A. Lee, (Vice-Chairman).

The Honorary Secretary was asked to write to Mr. Abbott informing him of his election and asking him to take up the work of the Chairman.

Mr. Hughes thanked the Meeting for the honour they had done him in re-electing him Honorary Secretary. He had had the honour of acting for some years past and assured them that he would do his best to forward the interests and work of the Association. He had also to thank them for the honour of being elected their Delegate for the Bangalore Meeting. The other Members of the Committee thanked the Members for the honour done them.

A vote of thanks to the Chair terminated the Proceedings.

PAPERS ON THE TABLE.

The Association's Books, etc.
The U. P. A. S. I. Circulars.
The Indian Tea Association Circulars.
The Madras War Fund Circular.
The Travancore Loan papers.
Correspondence, etc.

(Signed) C. FRASER,
Chairman.
(„) ERNEST A. HUGHES,
Honorary Secretary.

Shevaroy Planters' Association.

Proceedings of a Committee Meeting held at the Victoria Rooms, Yercaud, on 10th August, 1916.

PRESENT.—Revd. Father Capelle, Messrs. E. Travers-Drapes, S. M. Hight, J. C. Large, C. Rahm, W. Rahm and Charles Dickins (Honorary Secretary.)

(1). The Notice calling the meeting was taken as read.

(2). *Attitude of Deputy Tahsildar towards planters, and his interpretation of Criminal Breach of Contract Act of 1859.*—Read letter dated 26/7/16 from Mr. E. Travers-Drapes with reference to the above.

After discussing Mr. Drapes' letter to a considerable extent the following Resolution was unanimously passed :—

"That this Committee being of opinion that the Deputy Tahsildar's attitude towards Planters and his interpretation of C. B. of Contract Act 13 of 1859 is a seridus menace to the Planting Industry on these Hills, and requires urgent investigation, the Honorary Secretary be requested to send a copy of Mr. Drapes' letter dated 26/7/16 to the District Magistrate—Salem—pointing out that other members of the S. P. A. have made similar complaints, and requesting the Magistrate to be so good as to meet an informal deputation of the members of this Association at his early convenience."

(Signed) CHARLES DICKINS,
Honorary Secretary,
Shevaroy Planters' Association.

Memo. of Resolutions passed at Annual Meeting, U.P.A.S.I.

ANALYTICAL CHEMIST.

I. That the Analytical Chemist be employed for another year, as recommended in Committee.—Carried.

R. G. A.

II. In the opinion of this Association it is the duty of every Rubber Estate in Southern India to join the R. G. A. enabling that Association to enlarge its scope of utility and to undertake Research Work in Southern India.—Carried unanimously.

RAILWAYS.

III. That this Meeting consider the whole matter of Railways in Planting Districts and outlets to West Coast.—Carried.

ARSIKERE-MANGALORE RAILWAY.

IV. That in view of the recent inspection by Mr. Richards of the proposed route of this Railway the Government of India be again approached through the Governments of Madras and Mysore as to the desirability of carrying out this project.—Unanimously carried.

MADURA-BODINAYAKANUR RAILWAY.

V. That in view of the increasing interests and development of Tea in the High Range of Travancore and the urgent need of improved facilities for transport and communication, this Association would ask the Government of India if they can see their way to begin the earth-work construction of the railway from Madura to Bodinayakanur with as little further delay as possible, so as to be in a position to complete the line as soon as possible after the conclusion of the War.—Carried unanimously.

CONDITION OF ROADS IN THE ANAMALAI DISTRICTS.

VI. That this Association draws the attention of Government to the state of the roads in the Anamalai District, and that in regard to road contracts, steps be taken to remove an undoubted misunderstanding between the Public Works Department and the planters—Carried.

POSTAL COMMUNICATIONS IN COORG.

VII. That the U. P. A. S. I. Association wishes to draw the attention of the Director General of Posts and Telegraphs to the frequent misconnection of mail trains between Madras and Mysore, thereby causing a delay of 24 hours in the delivery of mails in Coorg, and also would draw attention to the unnecessary delay in the delivery of internal mails on the Somwarpet and Suntikoppa Sections owing to the mails to these places going *via* Frazerpet, instead of *via* Mercara, to which attention was drawn so long ago as last April.—Carried.

SALE OF WASTE LANDS IN THE NILGIRIS.

VIII. That this Meeting suggests an extension of the Durkast Rules to apply in place of the Waste Land Rules to all Planting Districts or that the supplemental rules be so extended as to allow of a larger area being taken up under them.—Carried.

EXCESS PROFITS TAX.

IX. That with regard to the excess profits duty the United Planters' Association of Southern India accords to the Rubber Growers' Association and the Indian Tea Association its hearty support in the efforts they are making to have the statutory percentage increased to 25 per cent. in the case of Rubber and 12 per cent, in the case of Tea ; and that the Secretary be asked to bring this Resolution to the notice of the Chairmen of these bodies as soon as possible with the request that they will press for an early decision. At the same time to ask our Representative on the London Chamber of Commerce to take action with a view to attaining this end.—Carried.

MERCANTILE SHIPPING TONNAGE.

X. That this Association desires to request the Government of India, through the Madras Government, to represent to the Imperial Government the necessity for steps being taken to replace the losses of Mercantile Shipping Tonnage and thus to ensure the necessary cargo carrying capacity being available at the termination of hostilities to relieve the present situation which has caused freights on tea to London to be almost quadrupled since the outbreak of the War and which threatens to restrict planting developments seriously.—Carried.

EXPORT DUTY ON TEA.

XI. That this Association urges with reference to the Export Duty on Tea from India, that a countervailing duty be imposed on all foreign teas imported into the United Kingdom.—Carried unanimously.

IMPORT DUTY ON COFFEE.

XII. Whilst recognising the necessity of taxation, and willingly paying such import duties as the Imperial Government have deemed fit to impose on the importation of Coffee into the United Kingdom this Association wish to bring to the notice of the Imperial Government, the present position of Coffee. which owing to the great restrictions of markets, and lack of tonnage, &c., brought about by the War, has had a serious setback, and views with alarm and apprehension the possibility of any further increase of the import duty, which would most seriously affect the financial stability of the industry—Carried.

SOUTH INDIA PLANTERS' BENEVOLENT FUND.

XIII. To amend Rule IX (c) of the Rules of the Southern India Planters' Benevolent Fund by inserting between the words 'years' and 'will' the additional words 'or any subscriber on the payment of the difference between Rs. 200 and such sum as he may have already subscribed to the Fund.'

So that Rule IX (c' shall read :

" Donor of Rs. 200 to the Benevolent Fund, or an annual subscriber of Rs. 40 for five years, or any subscriber on the payment of the difference between Rs. 200 and such sum as he may have already subscribed to the Fund, will be welcome as a Patron, and have a copy, etc., etc."—Carried.

SOUTHERN INDIA PLANTERS' BENEVOLENT FUND.

XIV. To amend Rule VI by addition of the words 'Or placed at Deposit with the Bank of Madras ' so that it shall read :

VI. That the surplus Funds shall be invested in Government Securities or placed at Deposit with the Bank of Madras at the discretion of the Finance Committee.—Carried.

SOUTHERN INDIA PLANTERS' BENEVOLENT FUND.

XV. To amend Rule IV by substitution of ' Bank of Madras' in place of Mercantile Bank of India, Madras, so that Rule shall read: That the Funds shall be kept at the Bank of Madras which will make investments and only honour cheques signed jointly by the Chairman and the Secretary. —Carried.

"PLANTERS' CHRONICLE."

XVI. That a list of current bulletins on Agricultural matters be published in the *Planters' Chronicle* with particulars as to where obtainable and cost.—Carried.

"PLANTERS' CHRONICLE" DESIGN FOR COVER.

XVII. That this Association do accord a most hearty vote of thanks to Mr. Cecil Wood, Principal of the Agricultural College at Coimbatore for his kindness in preparing a cover design for the *Planters' Chronicle*. —Carried.

"PLANTERS' CHRONICLE" DESIGN FOR COVER.

XVIII. That this Association while approving of Mr. Wood's design, is anxious that other designs should be submitted before making a definite choice, and Members of the Planting Community are specially invited to submit designs.—Carried.

ST. GEORGE'S HOMES.

XIX. That this Association do call the attention of District Planters' Associations to the urgent need of support required by the St. George's Homes and that all steps may be taken in order that they shall receive the fullest support of the Planting Community.—Carried.

BRITISH EMPIRE UNION AND ALIEN ENEMIES.

XX. That this Association do strongly support the views expressed in the *Madras Mail* and those by the Madras and Bengal Chambers of Commerce and do vigorously combat the admission of enemy aliens into India. Further that this Association feels that it is most important that it should lend its weight to obtain prohibitive restrictions against alien enemy goods in Indian markets which may be imported to the detriment of British Allies and Indian Trading subjects.—Carried.

BOOK OF PROCEEDINGS.

XXI. I beg to propose that all delegates advise their local Associations to authorise their Secretaries to order a copy of the yearly Book of Proceedings for every member and distribute them either free or recover the cost from their members as may be arranged.—Unanimously carried.

KALISYNDIKAT MANURIAL EXPERIMENT FUND.

XXII. That the Kalisyndikat Manurial Experiment Fund Account be closed and the balance tranferred to the General Account for the use of the Scientific Department and that the Experimental Plot Fund be closed in the same manner.—Unanimously carried.

AIRCRAFT FUND.

XXIII. That the balance in hand of the Aircraft Fund be remitted to the Overseas Aircraft Club and the Fund closed.—Unanimously carried.

TRANSFER OF FUNDS OF THE U. P. A. S. I. TO THE BANK OF MADRAS.

In consideration of the way the Bank of Madras met us at the outbreak of the War and helped us to tide over what might have been a serious financial disaster to our Industries, it is proposed that all our accounts be placed in the keeping of that Bank.—Carried.

ELECTION OF PLANTING MEMBER OF COUNCIL.

XXIV. That the Government of Madras be asked to sanction this alteration on the rules of election to allow of nomination and suggest that the method of electing the Planting Member be altered so that every District Association be invited two months before the date of election to nominate any candidates that they wish and that only such candidates be eligible and that the Secretary, U. P. A. S. I., issue ballotting papers with the names printed on them.—Carried.

MARKETS, PRICES AND STATISTICS.

Coffee.

Brazil receipts have been :—

To 15th July	... 525,000	545,000	396,000
To 22nd July	... 862,000	924,000	667,000
To 29th July	... 1,267,000	1,359,000	1,026,000

Offerings at auction have been as follows :—

—	11—14 July.	18—21 July.	25—28 July.	Total since 1st Jan.	Last year.
East India ...	Nil.	440	Nil.	26,159	38,188
Costa Rica ...	1,581	1,094	1,293	88,460	87,929
Other Milds ...	14	149	966	57,420	124,680
Brazil ...	1,866	54	1,907	61,240	98,991
Robusta ...	Nil.	Nil.	Nil.	1,351	12,384
B. E. A. & Uganda ...	Nil.	Nil.	Nil.	7,369	10,270

The market has been quiet but the prices are steady.

Tea.

The market has been rather irregular, but there has been a fair demand at steady prices.

The following prices have been obtained for South Indian teas at the auctions of July 17th, 24th, and 31st :—

—	B.O.P.	O. P.	Pek.	B. P.	B.P.S.	P. S.	P. F.	Fgs.
TRAVANCORE.								
Munaar ...	11½	1/-	10¾	11¼	...	...	...	...
	...	...	10¼	11	...	10¼	...	...
Nullatanni ...	11*	11¼	10¾	10¾	...	...	...	...
	11	10¼	...	10¾	...	9¾	...	11¼
Gundamullay ...	1¼	1/-	11	1/-¼	...	...	...	11½
	11¾	11	10½	11¾	...	10¼	...	11½
Sevenmullay ...	...	11¼	10½	10¾	...	10½	...	...
	11	10¾	10½	10¾	...	10	...	...
	...	...	10	10½	...	9½	...	...
Chokanad ...	11*	11½*	10½	11	...	...	...	10¾
	11	11	10½	10¾	...	10	10¾	...
Letchmi ...	...	11*	10¾	11½	...	10¼	11½	...
	11	...	10½	11	...	...	10¾	...
Haileyburia ...	10¼	...	10	10	9½	...	...	...
Periavurrai ...	1/-	11¾	...	11¾*	...	10½	11½	...
	11½	11¼	10¾	11½	...	10¾	11½	...
	...	10¾	...	11	...	...	11¼	...
Kolie Kanum ...	11	...	9½	10	...	...	...	...

—	BOP	O. P.	Pek.	B. P.	BP.S	P. S.	P.F.	Fgs.
TRAVANCORE.								
Stagbrook ...	...	...	9¼	9¾	9¼	...	...	...
Nellimunda ...	9¾	...	...	9¾	9¼	...	...	...
Mount ...	11¼	...	9½	10½	...	...	...	...
Periakanal ...	...	11¼	10½	10¾	...	...	...	...
Balanore ...	...	...	9½	10¼	...	9	...	...
Vembenard ...	10¾	...	9¼	10¼	...	9	...	...
Ladrum ...	...	...	9½	10	...	...	...	...
Kuduwa Kanum..	10½	...	9½	9¾	...	9¼	...	...
WYNAAD.								
Erramaculla ...	...	...	10¼	10¼	...	9¾	10¼	...
Chulika ...	9½	9¼	...	9¼	9	...	...	..
NILGIRIS.								
Prospect ...	11½	1/-	10¾	11¼	...	...	...	...

* Withdrawn from sale.

Rubber.

The following quantities of Rubber were imported into the United Kingdom during the month of June in Centals of 100 lbs.

	1916.	1915.
From Dutch East Indies ...	15,566	7,248
From French West Africa ...	1,413	2,583
From Gold Coast ...	2,172	393
From other Countries in Africa ...	5,672	7,734
From Peru ...	558	2,929
From Brazil ...	15,495	21,410
From British India ...	1,928	673
From Straits Settlements ...	21,821	49,607
From Federated Malay States ...	34,432	21,025
From Ceylon ...	13,267	14,611
From other Countries ...	2,366	7,133
Total Imports...	114,780	135,346

The following quantities were re-exported during the month of June in Centals of 100 lbs.

	1916.	1915.
To Russia	1,382	37,338
To France	21,576	9,062
To United States	69,251	68,720
To other Countries	10,691	16.505
Total Re-exports...	102,846	131,625

Statistics.

The Burmah Season and Crop Report for 1915-16 shows the following figures :—

Total acreage	97,823,665
Reserve Forest	15,638,320
Not available for cultivation	40,618,211
Culturable waste	23,451,179
Cultivated area	14,237,930
Area under Coffee	79
Area under Tea	1,785
Area under Rubber	57,785

R. D. A.

The Planters' Chronicle.

RECOGNISED AS THE OFFICIAL ORGAN OF THE U. P. A. S. I., INCORPORATED.

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THE U. P. A. S. I.

(INCORPORATED.)

Contents.

We publish two pages of Markets, Prices and Statistics.

The Report of the Director, Labour Department, read at the Annual General Meeting is published.

Our correspondence columns are of a varied assortment and interesting.

We hear that Mr. H. F. O'Reilly who was on Yendayar Estate before leaving for him to join the Army has been wounded; but his many friends will be glad to hear that his wound is only a slight one. Mr. O'Reilly left in February 1915 and is now a Captain in the Royal Irish Regiment.

The Honorary Secretary, Bababudin Planters' Association, writes as follows: "I regret to have to inform you of the death of Mr. R. D. Lovett, who was killed in France in an attack on a village on July 1st. He enlisted in the 16th Batt. (Public Schools) Middlesex Regiment and I am uncertain what his rank was when he was killed. He was a member of this Association, a Delegate of this Association to the U. P. A. S. I. meeting of 1913 and Vice-President of this Association for 1913-1914."

We deeply regret to report the death of Mr. John Christie, Managing Director of Messrs. Peirce, Leslie & Co., Calicut. His loss will be long deplored by his friends whose name was legion. The good he did lives after him. He was a generous supporter of everything in connection with the Planting Industry. It would be difficult to name one so universally liked.

Delegates who have not ordered direct from Messrs. Barton and Co., copies of the group photograph taken of the Delegates at the last Meeting are invited to send their names to the Editor.

SOUTH INDIA PLANTERS' WAR FUND.

	Rs.	A.	P.
Amount previously acknowledged	46,684	12	8
C. Hendry	50	0	0
Messrs. Barber and Pascoe	75	0	0
"Two Rs. per acre p. a. for 5 years" ...	2,000	0	0
Total...	48,809	12	8

MARKETS, PRICES AND STATISTICS.

Coffee.

Monthly Statistics to 31st July.

	1916 Tons.	1915 Tons.
East India.—		
Landed to 31st July	2,035	3,615
Delivered to 31st July	1,868	2,514
Stock on 31st July	1,553	2,560
Coffee of all kinds.—		
Stock in U. K. on 31st July	36,300	27,900
European Imports to 31st July	229,405	332,355
European Deliveries to 31st July ...	227,945	339,300
European Stock on 31st July	207,765	248,880
World's visible supply 31st July... ...	464,355*	487,705

* An increase of 47,590 tons compared with an increase of 45,120 tons last year.

As 31st July 1914 closed the last monthly period before the War some further comparative figures may be of interest.

31st July.	1916.	1915.	1914.
Milreis price in Santos ...	5,650	4,400	4,400
Rio Exchange ...	12 5/8	12 7/8	15 9/32
Futures (current month) ...	46/6	36/6	33/6
Superior Santos C & f ...	55/	45/6	52/
Middling East India ...	75/	70/	70/
Good Middling Costa Rica ...	75/	78/	79/
Stock of Brazil Coffee in London...	19,490	10,110	8,290
Brazil receipts to 5th August ...	I,677,000	I,877,000	1,315,000

Offerings in Auction have again been very small, only about 4,400 bags, of which 445 bags were Coorg 1st and 2nd sizes, which met with very little demand and only a small part sold. A few sales made privately show steady prices.

Tea.

On 7th August Tea met a fair demand but prices all round were in buyers favour, especially for the lower grades. The following prices were obtained for South Indian Tea at the sales on 7th August.

—	B.O.P.	O. P.	Pek.	B. P.	P. S.	B.P.F.	Fgs.	Dust.
TRAVANCORE.								
White Hills ...	10	...	9	9*	...	...	...	...
Bon Accord ...	9¾	...	9	9¼	...	...	...	...
Pambanar ...	...	...	9	9½	8¾	...	...	...
Letchmi ...	...	...	9½	10¼	9¼	11	...	...
Vembenard ...	10	...	8¾	9	...	...	...	...
Stagbrook ...	9¾	...	8¾	9	...	...	...	...
Kolie Kanum ...	10½	...	9	9¾	...	...	...	...

—	B.O.P.	O. P.	Pek.	B. P.	P. S.	B.P.F.	Fgs.	Dust.
TRAVANCORE.								
Yellapatty ...	10¾	9¾	9¾	10¼	9½	...	10½	...
Ladrum ...	10¼	...	9½	...	9	...	...	...
Fairfield ...	10	...	9¼	9¼	...	...	...	...
Venture ...	9½	...	9	...	8½	...	...	8¼
Nullatanni ...	...	9¾	9½	10	9*	...	...	...
NILGIRIS.								
Seaforth ...	10¼	9¾	9½	10¼	...	...	...	...
Barwood ...	10½	...	9¼	..	...	...	...	...
Davera Shola ...	10½	10¼	9½	10¼	...	...	...	...
Prospect ...	11¼	...	10¼	10¾	...	...	...	...
WYNAAD.								
Wentworth ...	9¾*	9¾*	9½	...	9	...	...	...

* Withdrawn from sale.

Rubber.

Market quiet but very steady. Crepe 2/2¾. Smoked sheet 2/2¾*d*. On 10th August firmer and ¾*d*. higher.

Spices.

Pepper.—Market quiet but rather firm.

Cardamons.—No change. The difficulty, almost impossibility, of getting permits stops all business.

Statistics.

The Ceylon Blue Book for 1915 contains the following figures.

		1916.	1915.
			Sq. Miles.
Total area of Ceylon	...		25,331⅞
		Acres.	Acres.
Area under Coffee	...	913	877
Area under Tea	...	486,536	426,816
Area under Rubber	...	168,178	198,588
Area under Cinchona	...	100	...
Exports—			
			Cwts.
Coffee	...		88
			lbs.
Tea	...		215,632,727
Rubber	...		51,526,730

The following yields per acre of Tea are given for different districts :—

Colombo	...	136 lbs.
Kalutara	...	334 ,,
Kandy	...	355 ,,
Nuwara Eliya	...	200 ,,
Galle	...	666 ,,
Badulla	...	550 ,,
Kegalle	...	1,000 ,,

R. D. A.

LABOUR DEPARTMENT

OF THE

UNITED PLANTERS' ASSOCIATION OF SOUTHERN INDIA.

INCORPORATED.

Report of the Director.

Gentlemen,

I submit my report for the second year's working of the Labour Department.

Income—

The subscribing area at the close of the 2nd year was ... .101,666·43 acres,

	Rs.	a.	p.	Rs.	a.	p.
Subscription @ Rs. 2 per acre on Tea, Coffee and Rubber ...	198,469	0	4			
Subscription @ Re. 1 on Cardamoms ...	2,047	8	0			
				200,516	8	4
Entrance Fees on new acreages ...				1,059	5	1
There was a balance due by subscribers for the 1st year of	22,480	15	6			
Add a refund made during the 2nd year...	64	8	0			
				22,545	7	6
				224,121	4	11
3rd year's subscription received in advance ...				461	4	0
Total Rs...				224,582	8	11
Deduct 1st year refund on Cardamoms				1,845	8	0
				222,737	0	11
				206,294	0	11
Of this the amount collected during the year was leaving a balance due by subscribers of ...				16,443	0	0
Interest received from the Bank				1,198	14	11
The Estimate sanctioned by the Control Committee for the year's working was..	202,362	8	0			

Expenditure—

The sum actually spent including depreciation amounted to ...	165,661	14	6
which is less than the Estimate by ...	36,700	9	6

and was unspent partly owing to the casualties in the superior staff of the Department, and to delays thereby caused in the location and selection of subordinate agencies, with a few savings under minor headings.

Accounts.—The audited accounts in your hands show the position on 30th June 1916.

Work done—The number of undisposed cases at the end of the previous year was ... 1,150

The number of instances in which the assistance of the Department was invoked by subscribers during the year was ... 4,186

Total... 5,336

The total number finally disposed of was	...	2,403
The number of cases which for various reasons and with the consent of the subscribers concerned which had to be dropped was		167
	Total...	2,570
Pendency—The balance of cases about which correspondence, enquiry and action is still in progress is	...	2,766

Cash recoveries.—The amount of cash which the Department recovered from defaulters and remitted to subscribers was Rs. 27,134 odd, of this Rs. 3,500/- may be considered as a windfall, being a large recovery from one man under exceptional circumstances: of the remainder only a few cases went as far as the law Courts: over Rs. 20,000/- being recovered by moral suasion or with the assistance of panchayats *ad hoc.*

The amount that was found to be irrecoverable by any known means was Rs.17,689 and efforts are still being made with reference to further outstanding sums totalling Rs.44,558. Total involved Rs.89,381 odd. The percentage of recovery to demand is therefore about 35%.

Defaulters.—604 defaulters owing Rs.41,097 odd agreed to return to the Estates of subscribers of whom 463 nearly 77% owing Rs.33,201 odd reached the Estates.

Internal competition.—I have only got on record 19 cases which the Department assisted to regulate, but there were numbers of others not brought into our statistics owing to their trivial nature, and the failure of our agents to report them.

Unfair Competition—was dealt with in 52 cases.

External Competition.—Deliberate cases of enticing our advanced labour to emigrate have not come to light. Emigration of labourers owing money to S. Indian Estates has occurred in a few instances, and it has always been in cases where the people concerned have voluntarily joined gangs proceeding out of India in order to escape their liabilities. I acknowledge with thanks the kind and ready manner in which the Ceylon Labour Commission has assisted in tracing those who went to Ceylon, and in recovering some of the money owed to our subscribers. I have not yet approached the authorities in charge of recruiting for Malaya, owing to the well-known unexpected and unfortunate causes which demanded my personal attention,

Information was supplied to Estates about 2044 Labour Suppliers Maistries, and Kanganies, as to their property, solvency, character and operations. I will welcome an extension of business in this direction, as one of the first steps in the successful management of labour is to get an accurate knowledge about those whom we employ.

Laggards,—1890 were hurried up.

Assistance was asked for and given to 1048 Labour Suppliers, Maistries and Kanganies who were helped in all their difficulties. Petty cases have not been recorded.

Advice was given to those Estates which applied for it as to where and when to get coolies.

Warrants.—83 Civil and 584 Criminal warrants have been successfully served through the Department. There has been a great improvement in the matter of giving correct addresses of warrantees and this has facilitated business.

Since the 1st April a new departure has been made in the *modus operandi* of the service of warrants by the Department, owing to the energy and work of the late Mr. Day, and the kind and zealous co-operation of the Hon'ble Mr. Barber, which resulted in G. O. No. 101 of 12th January 1916. It is sad to reflect that Mr. Day did not live to see the good result of his efforts to achieve success for which he strove so hard.

New Connections from New Districts.—A systematic and organized search for coolies entirely new to Estate work was made in 2926 villages. The result I confess has disappointed me. Except in few instances, we have found nobody offering to go to work on Estates and those that offered were not always acceptable to our subscribers. A few actual cases may be of interest. In some parts we were met with the objection that coolies who had gone to Natal had never returned, and when we pointed out that we asked no one to leave S. India, we were told this was the same story as had been told by the recruiters who took people previously to Natal. In another case a gang on the point of starting refused to go because the Maistry's mother-in-law had just died: after close investigation we were able to prove that she was not dead, which called forth from the Maistry a lament that the old woman seemed to have as many lives as a cat. Other domestic occurrences, which one would think could easily have been foreseen followed with startling unexpectedness, such as births and marriages and until these very necessary performances were over not one of the gang would budge. finally the rain fell and provided work on the spot, so every one changed their mind.

Another gang travelled safely 266 miles by train, walked another 7 miles, and had still 33 miles to do to the Estate when they were set upon and assaulted for no apparent reason by persons who cannot be identified, and dispersed, the individuals gradually finding their way back to their village displaying on their bodies the marks of the treatment they had received. We failed subsequently to make any one else in that quarter see the advantages of having anything to do with the Labour Department.

To sum up not only are coolies difficult to move, but when they are induced to do so, there are others whose interest it seems to be that they should not reach the Estates. An unpatriotic fear of being impressed for the Army, was also made an excuse for refusing to leave the villages.

In spite of these and other difficulties, there is no reason for giving up hope. There are none which cannot be got over. We have not given this branch of our business a fair chance yet. Owing to the death of two of our Senior Officers, our work was naturally very seriously interfered with, and I have every hope of success given a little better luck.

Advertising.—The usual general advertising was done. Three Cinema films, Tea, Coffee and Rubber have been ready for some time, but the Bioscope Companies which used to tour the villages before the War have ceased to do so. Those that we have been in touch with follow the

Railways, and cater for Railway subordinates and not for those whom we wish to reach. There has been a great delay in getting the coloured tin tablets, and after obtaining delivery they were found to be not up to the standard of the order. However we will find means to make use of the films and the tablets from now on.

Professional recruiters—We were not troubled by these.

Restriction of advances.—We dealt with 83 particular instances.

I regret that the appeal I made last year for combination in this matter did not have much practical effect. Both inside and outside the Department we met with a general expression of sympathy for the object in view. In some cases we were told that the present state of advances was satisfactory, in other words action might be deferred until advances were unsatisfactory, when to my mind the question will be much more difficult to deal with than it is now. The reason for this disinclination to combine to restrict advances is hard to understand. It may be based on mutual distrust, or want of courage, both equally unworthy motives. It is certainly not for want of a lead, which has been given so far as is possible when those that should follow either hesitate or hang back. Nevertheless my appeal has done some good: there is an undoubted improvement in some districts, slight though it may be. In others the rate at which the advances were increasing has been checked. I think every one now realizes that there is danger ahead, and more attention is paid to the subject than was previously the case. This is something gained, but we cannot be satisfied with it. I now ask District Associations, Proprietors, Superintendents and others interested whether they belong to Asssociations or are subscribers to the Labour Department or not, to make a further effort to effect a real and binding agreement among themselves to restrict advances, and loyally abide by such an agreement. Distrust of each other must be banished, individual courage must be shown, as it already has been shown with success in some cases, which will lead to a collective courageous solving of a great problem, worthy of a great effort. Now is the time, we have made a small beginning, why wait till difficulties increase? As for the means it is in your own hands, a loyal adherence to a combination or agreement arrived at among yourselves will do it.

Last year I dealt with the risks we take in making large advances: our own, our employers, our shareholder's money is needlessly risked. Another aspect is that a cooly has to be protected against himself. A man in debt is exposed to temptations from which one without debt is free. Coolies are apt to squander advances. it is a case of easy come and easy go. Wages earned by their own toil are better looked after. A man who has earned a competence by honest work is respected all the world over. One who has absconded with advances may be admired, but as elsewhere in India he is not respected. Our duty towards our own labour force is therefore to keep advances to within reasonable limits, and to give every facility for taking away a big cash balance at the end of the term's work.

Registration.—The thumb impressions of 965 persons were registered as a means of identification. The number is small considering that subscribers to the Department employ about 100,000 people, and I desire to have thumb prints of every one of them. At one time the U. P. A. S. I. attached great importance to Registration. A very cheap means is now available for the purpose. I request all subscribers to make use of it.

The long delayed Directory of Labour Suppliers, Maistries and Kanganies is now in the press.

Payments were made at the request of subscribers to a large number of Maistries and others, a practice I would be glad to see much reduced. Subscribers are asked to note that it does not work out well in the long run to introduce a third party between Master and servant in money transactions; and they should refrain from doing so except when absolutely necessary.

Warnings.—11 Circulars containing the names of 134 men who should not be advanced by subscribers have been issued.

General.—Over 1000 members of so-called Criminal tribes were introduced into the Annamallai district; which was selected as the one where conditions were most favourable for this experiment. It is too soon to say that they are a permanency, but I am glad to be able to report that so far it has been successful, and as far as at present can be seen, they promise to be a permanent and satisfactory addition to the labour force. The credit is due to the Hon'ble Mr. Barber, to the late Mr. Day and to the several Planters who exerted themselves to overcome the initial difficulties.

Casualties.—In my interim report which appeared in the *Planters' Chronicle* of 25th March 1916, I announced the grievous loss the Department sustained by the untimely death of two senior officers. I only allude to this again in order that the Book of Proceedings of the U. P. A. S. I. may have it on record.

"De mortius nil nisi bonum." Of the dead nothing but good. I wish it could always with equal kindness be said "Of the dead nothing but truth." Certainly nothing good can be said that is not true, and nothing can be said with truth that is not good, about our departed friends Day and Ward, whose capacity, energy, and resource in working for the Planting Community no one can surpass.

In conclusion I acknowledge with thanks the kindly support and assistance I have received during a year of great and unexpected difficulty, from the Chairman, and Members of the Control Committee, and from the Planting Member in Council whose time and patience I have often unduly taxed.

The Labour Department is also indebted to the Secretary Mr. Norton, who has in so pleasant a manner performed the unpleasant duty of collecting subscriptions. I thank also all subscribers of the Department for their forbearance and consideration and for the kind way in which they have dealt with my mistakes.

I remain, Gentlemen,

Your most obedient servant,

AYLMER FF. MARTIN,
Director.

Bangalore,
1st August, 1916.

CORRESPONDENCE.

11th August, 1916.

THE EDITOR,
Planters' Chronicle,
Bangalore.

Denudation of Soil.

Dear Sir,—Is this so serious I wonder as your article in the issue of the 5th instant makes out ?

Have yields per acre of tea and rubber gone back or forward every year ?

In tea—for example—are not the yields per acre now obtained such as were never dreamt of 15 years ago ? At the same time weeding has become cleaner year by year ?

Further to all appearances with judicious cultivation these yields are likely still further to increase.

There is no doubt mamoty weeding in the monsoon may be overdone but even if hand-weeding is only done in the monsoon, mamoty weeding would have to be resorted to in the dry weather and top-soil would still be removed.

If the Government of India want to prevent soil erosion, it is quite simple. The whole thing is a Labour Problem. *Stop Labour going out of India and* then we planters will have ample coolies for the most careful weeding imaginable and *no precious top soil will be lost*!! After all, a tea crop of 700-800 lbs. per acre would not seem to show mamoty weeding is so very harmful and this is what many of us obtain.

Yours faithfully,
X.

Chilean Nitrate Propaganda,
1, Royal Exchange Place,
Calcutta, August 12, 1916.

THE EDITOR,
Planters' Chronicle,
Bangalore.

Dear Sir,—In your issue of July 15th appears a letter by L. Newcome, on Manure Price Lists, in which he suggests that the Chilean Nitrate Propaganda should publish the price for Nitrate of Soda.

This office is not a Commercial institution, but established by the Chilean Government and Nitrate Producers, for the purpose of assisting planters with their manurial problems and indirectly propagating the consumption of Nitrate of Soda for crops in India. As Nitrate is the only product Chile exports while it imports large quantities of Nitrate bags and Rice from India, we also have to promote the trade relations between these two countries.

Owing to no Commercial Agents being appointed for Nitrate of Soda but all manure dealers buy in the cheapest market, and then sell at their own prices, it is clear that we cannot quote exact prices applicable to all parts of India, Burma and Ceylon.

In addition to free advice, literature and occasional free samples, we also analyse soils gratis for planters.

Trusting this will clear up the matter and that you will kindly allow space for this in your valuable journal.

Yours faithfully,

CHILEAN NITRATE PROPAGANDA,

RUNAR OLSSON-SEFFER.

Director.

Madras, 23rd August 1916.

To

THE EDITOR,

Planters' Chronicle,

Bangalore.

Dear Sir,—The following run will I think be of interest to South Indian Motorists. It was undertaken as a result of a bet that I would not get through from Bangalore to Madras in 12 hours with my side car out-fit. I was carrying in the side car about 100 lbs. petrol, luggage and spares.

I left The West End Hotel, Bangalore, a few minutes before 7 o'clock in the morning of Sunday last and arrived at The Connemara Hotel, Madras *via* Poonamallee at 2-30 p.m., the same day. The time can be authenticated by those who saw me leave The West End Hotel and Mr. Brind of the Connemara Hotel. I do not know whether this constitutes a record or not. I could have done it in better time as I stayed for half an hour on the road for tiffin. As I had not been over the road before it appears I got sowewhat off the main track, as I ran through Bowringpet and Jalarpet *via* the Ricecause way to Conjeevaram where I again lost some 10 to 15 minutes having gone out of my way again there.

The bicycle was running as strongly and well when I got to Madras as it was when I started but the side car springs were broken as I found when I reached Madras. The road for the most part was fairly good and I was able to get through without much difficulty.

I enclose my card and remain,

Yours faithfully,

E. A. H.

THE EDITOR,

Planters' Chronicle.

Dear Sir,—Dr. Coleman in his speech at U. P. A. S. I. Meeting appealed to the Planters to assist their native neighbours by experiment—practical experiment, outside their own particular line—be it Coffee or Tea; in fact to benefit their neighbours, and incidentally themselves. Sugar Cane fills the eye.

Dr. Coleman has travelled much we know, but the work he wishes is *not* one of the things he has seen.

I'm sure many regret this, myself amongst others; many no doubt have played at it in happier times. In years gone by—speaking for myself I can say—many years ago, I persuaded a man connected intimately with my Property, to dig an unsatisfactory paddy flat—and dig deep. At his request some months later, I visited his village to see the result, as he assured me, it was "The Talk of the Town": it was 80 miles away and there were no motors. By the time I got there the crop was fit to reap and say 6 ft. high—he too was a much disappointed man, as he said it was all straw—and he *did'nt want straw* or digging.

In another case having taken a man to a Government ploughshow, he was much interested [illegible], but said he would like to see them plough a *wet* Paddy flat. Being younger and more sanguine, this was arranged later and when we got there, there was a Rs. 500 pair of bulls in the plough—my man never looked at the Plough, but he said he couldn't afford white elephants, and as he came from Mulnaad, *he was perfectly right.*

Why, I can remember the Plough Experiments having such a hold on the Sircar, that a *European* Forest Officer proposed to me to plough my hill sides. With the fullest sympathy I suggest to Dr. Coleman he ploughs "a lonely Furrow" unless any experiments were carried out inside the 4 corners of the estate, they would have no chance, with any supervision that *any* Planter could give. Cattle or shift would surely spoil any such plot, sooner or later.

I've grown a vegetable garden a mile from my Bungalow but *now* it must be just outside my door to *have a chance.*

Dr. Coleman should bear in mind too, only proprietors could take a hand in these speculations, no Manager could be expected to.

Lastly—now-a-days the Labour is not—and it is quite a different thing to work under the Act XIII—and to work under the Aegis of the Freak Eagle.

I am, dear Sir,

Yours truly,

OLD PLANTER.

SCIENTIFIC DEPARTMENT, U P. A. S. I.

Scale of Fees for analysis in the Bangalore Laboratory.

A.—SOILS.

		Rs.
1.	Complete Chemical Analysis, including the available Potash and Phosphoric Acid	...40
2.	Mechanical Analysis	...10
3.	Complete Chemical and Mechanical Analysis ...	...50
4.	Calcium carbonate and oxide content	...10

B.—FERTILISERS.

1.	Potash in Potassic Fertilisers	8
2.	Phosphoric acid, total and citrate soluble, in Phosphatic Fertilisers	8
3.	Organic Matter, Insoluble Matter, and Nitrogen in Poonacs, &c.	6
4.	Organic Matter, Insoluble Matter, Nitrogen, and Phosphoric acid in Bones, Fish, &c.	8
5.	Complete Analysis of Fertilisers such as Composts, Cattle manures, &c.	...20
6.	Complete Analysis of Lime, Limestones, and Slaked Lime	...10

Half the above rates will be charged to all Members of District Planters' Associations.

For methods of taking samples of Soils and Fertilisers and the quantities to send for analysis see *Planters' Chronicle* Volume X. pages 207 and 216.

All samples for analysis should be sent plainly labelled to "The Planting Expert, 25, South Parade, Bangalore," and should be accompanied by a covering letter giving full information about the sample and the analysis desired according to the above table. Fees should be remitted to "The Secretary of the United Planters' Association of South India, 25, South Parade, Bangalore."

The Planters' Chronicle.

RECOGNISED AS THE OFFICIAL ORGAN OF THE U. P. A. S. I., INCORPORATED.

(Secretary's Registered Telegraphic Address "Planting," Bangalore.)

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THE U. P. A. S. I.

(INCORPORATED.)

Contents.

We publish a digest of a lecture delivered by Dr. Coleman at the Annual Meeting. Dr. Coleman is always listened to with the greatest interest and attention. Though the matter of his address is always interesting, it is the charm of manner in the delivery that holds his audience and while imparting, seems to seek information. After touching the question of Pests and Diseases he spoke of the duties of planters as regards other and allied forms of agriculture—a new departure which was very welcome.

Equally interesting and of equal importance was the valuable lecture delivered by Mr. W. McRae, M. A., Government Mycologist at the same Meeting on the Abnormal Leaf-fall of Hevea Rubber. By all Rubber Planters the conclusions at which he has arrived, after very careful study, his lecture and the methods of combating the disease recommended by him must, and will receive that careful attention, they thoroughly deserve.

We publish two pages of Markets, Prices and Statistics furnished by R. D. A.

We publish a letter from Mr. A. P. Kinloch giving news of one or two planters and expressing appreciation of the War Fund started for their benefit.

At the request of the Director, Labour Department, we publish an extract from the *Times of Ceylon*.

A short letter from "H" on page 458 appeals for the retention of the old cover of the *Chronicle* rather than for a new design.

We are sure that the heartiest congratulations from all planters will be accorded to Mr. Robinson of Bollibetta, Coorg, and his family on the magnificent performance of his son, W. Robinson, of the Worcesters in bringing down a Zepplin and gaining the coveted distinction of V. C.

SOUTH INDIA PLANTERS' WAR FUND.

	Rs.	A.	P.
Amount previously acknowledged	48,809	12	8
Mr. Stephen Bayly	10	0	0
Total...	48,819	12	8

Dr. COLEMAN'S LECTURE.

The following is a digest of a lecture delivered by Dr. Coleman at the Annual Meeting of the U. P. A. S. I.:—

Dr. Coleman said he presumed that many of his audience were heartily sick and tired of hearing of the diseases and pests of coffee, but some members had spoken to him suggesting that he should indicate what had been done in Mysore during the past year. The Green Bug was still with them. It had spread to a number of Estates, but as matters stood, he did not think that it was likely to ruin coffee in Coorg and Mysore. The pest had been investigated by his Assistants and their reports indicated that it had done very little damage except on some of the estates on the inner slopes of the Bababudan Hills. This he concluded was due to the fungi, which attack the pest, having persisted for a considerable time after the monsoon, which had the effect of keeping this serious pest in check. He did not think that they need fear they were going to suffer any great loss. Of course, it was an unpleasant thing to have, but they had a number of others like it so that one more made little difference. They had carried on an investigation of the subject of the ant as a carrier and had discovered that at least four species of ants do actually carry the green bug. From experiments in the laboratory it had been found that certain ground ants carry the bug from the coffee trees down to their nests below the ground. This had been substantiated this year, and they were almost certain that these ants also carry the bug into the trees. There were besides the large red tree ant, a little cocked-tail ant, the common small red ant, and the stinker ant which emitted an evil smell. The first two of these make their nests in the trees or in the coffee bushes themselves; the last two build nests in the ground. In Java they had contrived a very ingenious ant-trap as he had explained last year. It represented a nice home for the ant, the idea being that the ant in the rains would seek this dry shelter, as a home. The traps were then picked up and the contents shaken into a fire. But in Mysore all experiments with traps had failed. They were trying certain experiments to see if they could destroy the nests of ground ants by fumigation. That was all as regards the green bug, but he hoped, in the course of a month or so, to issue a bulletin which was being prepared on the subject. Its publication was delayed on account of certain coloured plates not having arrived.

With regard to coffee borer and other serious pests, things had been rather troublesome last year. Some planters had lost one-third of a first clearing in the year so that at that rate at the end of the third year, they would have entirely new coffee on the ground. The Coffee borer had been found in one kind of tree other than coffee. In addition another species of borer had been found which bears a very close resemblance to the coffee-borer. (Specimens were exhibited). This new species is to be found only in the dead branches of its host tree and not in the living as in the case of the coffee-borer. A number of experiments with regard to the use of repellants had been carried out, but had not been successful. The only successful repellant was one which had killed the coffee tree at the same time and so could not be used. Nor had lime succeeded as reported by some planters. His only explanation for this was that where planters had applied lime they had at the same time scrubbed the bark, and that it was really the scrubbing of the bark which had reduced the pest. Scrubbing had been done on a fairly large scale by the Department with fair success and was the only thing to be recommended as far as he knew. The borer began to emerge from the trees about the middle of October and

finished up about the middle of December, but this may vary in different districts and under varying conditions. The female beetle laid for two weeks after emergence and the eggs hatched out in from 6 to 12 days so that brushing or scraping should begin about the end of October and should be continued up to the end of November. With regard to the laying of eggs the beetle is at no particular pains. The eggs may be laid in crevices in the bark or quite exposed, so that scrubbing properly done would destroy a large number of eggs, and the larvae could not possibly reach the tree again if once the eggs were removed and dropped to the ground.

The question of the cost he would leave to planters; they had found that a cooly could do from 150 to 200 trees a day. There was some hope that they might be able to apply some chemical which may reach the larvae in the early stage of their development and not affect the tree. Dr. Coleman was rather sceptical, but it would be tried.

With regard to black-rot and other fungus diseases of coffee he would not say much as this matter was up before the Coffee Conference in June, and had been pretty thoroughly discussed then.

So much for their work in Mysore in connection with the coffee pests, but he would like to speak of the relation of the coffee planter in general to agricultural work in India. The planter in Southern India had hitherto occupied an anomalous position. There was no doubt that planters in pioneering agriculture on a large scale had enriched the country to a great extent. He would like to compare the treatment of the planter in India with the planter in Java. In Java there were a large number of experimental stations dealing with the problems of planters who received assistance from Government in the same way as any other body of agriculturists. That was a sensible way of helping an important industry. It seemed to him the reason why planters had had to go their own road in India was because the amount of money and the scientific men available were so small, that the smaller interest had to give way to the larger. When the U. P. A. S. I. Scientific Department came into existence, a slight change became noticeable and Government had recognised that there was a certain obligation in that they had given contributions towards the maintenance of that Department. Now in the last year, the Madras Government had gone a step further and had accepted a scheme by which their Department would become a part of the Madras Agricultural Department. By this arrangement they would have the privilege of obtaining assistance from Scientific Officers properly qualified to carry out experimental work.

At the same time there were also new duties which would be thrust upon the planters. There had been an idea hitherto that the planter existed in a state of splendid isolation, and the feeling has been that planters had been led to view the agricultural industries of India in a rather narrow light as outside their immediate concern. But they must now take an interest in general agriculture. It would be extremely good for them and for the country. They constituted a large body of men who had spent most of their time in this country, but their experience was to a large extent a closed book to the agricultural officers in India. Planters had to deal with large questions that must fit them especially to give opinions which would be of value in the development of the agricultural resources of that part of the country which immediately surrounded them. The Mysore planters, for example, were surrounded by areas with wonderful agricultural possibilities but generally in a very backward state. Of course there were many factors involved, such as the

difficulties of transport which might not be settled for years. But he felt strongly that the Mysore Malnaad was the coming agricultural part of the province whose resources were enormous. Planters should therefore take more interest in the development of agriculture other than that represented by their own direct interest.

They might consider all he had said on this subject as so much twaddle which they had heard before but he was nevertheless convinced that their absolutely unbiassed opinion of the needs of the country found about them was of the greatest value. They have the control of fairly large areas where ryot crops are and can be grown. From their standpoint, these areas had apparently not been worth considering. They might say they had so much of their own to do that they had no time for this sort of work, but he remembered an old professor of his saying that if you have anything you want done go to the busiest man. not to the man who has nothing to do. He felt certain that if they would find the time to devote to such questions very appreciable results would ensue. The difficulty at present was to get people to carry on continuous demonstration work. The average ryot would not go on after the first year if it was not successful, but the knowledge and education of the planter were factors that made for success. If they really took the matter in hand and gave agricultural improvements a trial through a series of years on the lands under their control, the results were bound to be substantial. He was particularly anxious that they should help in the extension of sugar-cane cultivation. Some had no doubt burnt their fingers in growing this crop, but there could be no question that if they went about it the right way it was highly profitable. The conditions in the western parts of Mysore were ideal for the cultivation of sugar-cane. He would lay it before them that it was really their duty to do something to help the agricultural departments. Those departments were trying to help the planter who was about to obtain more help soon. The conditions were going to be much more favourable than hitherto. In conclusion, there were signs already that the Mysore Government appreciated the need of advice from the planting community. and he was able to say that their Chairman had been appointed a member of the Agricultural Committee of the Economic Conference. He appreciated Mr. Browne's publicspiritedness in taking up this work in addition to the many other duties with which he was already burdened. (Applause).

THE EDITOR,

Planters' Chronicle,

Bangalore.

Chronicle Cover Design.

Sir,—With reference to the editorial note in your issue of 26th instant inviting members of the Planting Community to submit designs for a new cover for the *Chronicle*, may I plead for no change being made. The present cover appears to answer its purpose in every respect; and I for one would much regret to see it replaced by an "artistic" design including such things as mosques, palm trees, elephants, canals etc., calculated to distract the attention of your subscribers from the interesting matters within the cover.

Your faithfully,

H.

August 28th, 1916.

ABNORMAL LEAF-FALL OF HEVEA RUBBER.

The following lecture was delivered by Mr. W. McRae, M.A., the Government Mycologist at the Annual Meeting of the U. P. A. S. I.:—

Hevea brasiliensis in South India has recently become attacked by a fungus hitherto little known on rubber plantations. The disease occurs in most of the rubber growing areas, *viz.* Travancore, Cochin, Malabar, and the Anamalais. As far as my information goes it appears to be widespread in these districts, most of the estates having it to some extent in one form or another. It was first definitely noticed in 1913 as a fruit-rot, but has now in addition become noticeable as an abnormal shedding of leaves during the monsoon from June to August. This phase of the disease is known to planters by various names, such as second leaf-fall, monsoon leaf-fall, and abnormal leaf-fall. In this paper it will be called abnormal leaf-fall. In December and January Hevea sheds its leaves and this is a natural phenomenon usually known as "wintering." All or nearly all the leaves fall then. Sometimes all the leaves are shed from the trees before the new flush appears, but in many trees the new flush of leaves is coming on while the old leaves are falling. The leaves assume various shades of yellow, brown and red and the phenomenon is comparable to the wintering of deciduous trees of temperate regions.

The field characters of the disease as known at present may be given chronologically, though this is not the order in which they have been investigated.

Branches that have suffered heavily from abnormal leaf-fall during the monsoon often die back during the ensuing cold weather. From the living proximal regions of such branches fresh shoots are produced about the middle of February and begin to wilt about the middle of March. Tiny droplets of latex may appear on the leaves and leaf-stalks. The leaflets shrivel, dry up and fall off, leaving the leaf-stalk attached to the twig for some time, or the leaf may fall off as a whole. The lowest two or three centimeters of these shoots soon become discoloured and the shoot ultimately dies back to its parent branch.

During May and June leaves on some branches become yellow. This is seen more frequently during the showers that precede the monsoon. It occurs only here and there and does not attract much attention.

From about the middle to the end of June, or in other words about a fortnight after the monsoon bursts, the fruits on infected trees begin to show dull ashy-grey portions on their surfaces. The discoloured part is slightly wrinkled and sunk a little below the surface level of the healthy part of the fruit. It frequently appears at the proximal or stalk end of the fruit and gradually extends downwards and laterally till the whole fruit is covered. Sometimes, however, it appears first on the side of the fruit or at its distal end. Several discoloured spots may appear and run together. Drops of latex appear here and there on the surface and gradually turn black. The outer covering of the fruit becomes dark and sodden and infected by a soft rot. It splits along the three sutures (or cracks) exposing the capsule within and remains attached to it. The capsule often does not split and the seeds either never form or become rotten. The decayed fruit hangs on the tree for a considerable time, then falls off, leaving the stalk attached to the branch, but it may hang on the tree even till the next season.

A few days after the dull ashy-grey colour appears, especially during a break in the monsoon when there is little or no rain for a day or two, the infected surface becomes covered with a thin incrustation which is white when dry. This consists of mycelium of a Phytophthora with a most copious formation of sporangia.

About a fortnight after the monsoon has set in steadily and soon after the fruit-rot has appeared, infected trees begin to shed their leaves, a few at first, then in gradually increasing numbers, and this goes on for about a month or even six weeks. It is most noticeable from the middle of July to the middle of August, after which time the trees cease to shed their leaves to any appreciable extent. Some trees lose all their leaves and stand quite bare with the rotting fruit showing conspicuously, but most lose only a portion of their leaves. By August the mass of leaves on the trees looks decidedly thin and the ground is covered by a thick coating of fallen leaves. They sometimes become yellow before they fall as they do in the normal periodic leaf-fall in December and January, but they may be quite green when they fall. There is often a discoloured spot on the leaf-stalk, but that is not always present.

After this second and abnormal leaf-fall a new flush of leaves appears and the trees look quite normal again except for the considerable number of dead twigs that are present.

This abnormal leaf-fall usually occurs first on Hevea trees when they come into the fruiting stage, which is in South India usually about the 5th year. Then, however, it is the fruit-rot that is most in evidence while in succeeding years the abnormal leaf-fall becomes more noticeable. Younger Hevea does not usually have this abnormal leaf-fall though it has been seen occasionally on individual trees and groups of trees before they reach the fruiting stage and in one instance on a few trees that had been planted only two years, but it has not been found in nurseries.

After the leaves have all fallen off, the current year's branches often die back during the monsoon and this dying-back may proceed along the larger branches during the ensuing cold weather.

During the heaviest part of the monsoon, when trunks of trees are continually wet, a slight rot sometimes appears on or near the tapping cut. The bark becomes soft and dark coloured and this may extend for some distance along the cut and upwards from it in dark coloured streaks.

The loss caused by this disease is difficult to estimate directly in terms of made rubber as the disease has attacked rubber in South India in the early years of the industry, so that it is difficult to estimate the yields that may normally be expected. Still the following estimate, or guess, has been made for particular areas, after talking with rubber planters. The loss which occurs during or after abnormal leaf-fall may amount in badly affected blocks to 30 or 40 pounds dry rubber per acre. Besides this there is dying back of branches large and small that must cause some diminution in latex though this is impossible of estimate.

There are various references to an abnormal shedding of leaves of Hevea brasiliensis in the literature about this plant. Petch in his book on the Physiology and Diseases of Hevea brasiliensis, pages 173 – 177, mentions it under the title of climatic leaf-fall in Hevea.

Again in the Administration Report for 1912-13 Petch reports that he has determined that "leaf-fall which often follows the fruit disease and is characterised by the appearance of a dark brown ring on the leaf stalk is caused by the canker fungus (Phytophthora Faberi)."

The Assistant Mycologist at Peradeniya, who was acting for the Mycologist when the latter was on leave, told me in correspondence that they have had leaf-fall for several years in Ceylon, that it becomes serious only during long continued spells of wet weather, and that it had been bad on low country estates. Again in the Tropical Agriculturist for 1916, vol. 47 page 29, the acting Botanist and Mycologist reports on Hevea. "Taken all over, there appeared to be a general diminution of disease. The canker fungus, Phytophthora Faberi, again heads the list. Pod disease caused by this fungus was severe in some districts in July; this was accompanied by heavy leaf-fall owing to the spread of the fungus to the leaf-stalks."

In the Tropical Agriculturist for 1914 Vol. 42, page 268, there is a reference to an abnormal leaf-fall in Surinam. Here the fact is stated that Hevea drops its leaves twice a year in Surinam.

These are some references that show that an abnormal leaf-fall occurs in rubber growing areas outside South India.

I shall now tell you of the occurrence of the fungus Phytophthora on the different parts of the tree.

In the branches.—On splitting a branch that has suffered from abnormal leaf-fall in the previous monsoon and has died back to a certain extent there appears a clear line of demarcation between the dead and living parts. The line is about $\frac{1}{8}$ of an inch broad and is dark brown. The dead wood is dry and brittle, brownish in colour and the pores are easily seen, while the living wood is moist and tough, yellowish in colour and the pores are not so clearly visible. Sections looked at under the microscope show hyphae in the dead tissues and in the living tissues adjacent. The hyphæ occur in the bark, wood, medullary rays and pith. When shavings cut with a sterile knife from the region where dead and living tissues meet are kept moist over-night, a copious growth of hyphae is produced and sporangia are formed. When a portion of the dead wood is included in the shaving, other fungi, especially Fusarium, are present as well as the Phytophthora. The dead branch contains several fungi which are purely saprophytic and have no relation to the cause of the die-back. The hyphae in some cases extend only an inch or two along the living tissue while in other cases they are found much farther along the living part of the branch, especially when the fresh young shoots have developed. The mycelium extends into the tissues of the discoloured portions of those shoots when they are wilting, but it may not be found right up to the leaves. It looks as if the water supply to those wilting shoots had been cut off, yet the mycelium does not appear to fill up the water-tubes to such an extent as to suggest that it clogs them and directly retards the passage of the sap. It is often, however, richly developed in the medullary rays and this may cause the wood to cease to perform its functions. The mycelium has also been found inside the branch below an infected terminal bud as well as the place where the stalk of an infected fruit joins the branch.

On the leaves.—The part of the leaf to show infection first may be the leaflet, the stalk of the leaflet, or the stalk of the leaf. On the green leaf-blade dull grey spots appear which are circular in outline and enlarge, several running together to form a large irregular spot. Tiny drops of latex

are often present towards the interior of the spot and near the edge a faint glistening appearance may be seen with a lens and this consists of clusters of sporangia of Phytophthora. The stalk of a leaflet or of a leaf may have a discoloured spot. Sometimes it is shrunk slightly below the general surface and has drops of latex. At this stage the leaves are ready to fall. A single leaflet whose stalk alone is infected may fall off leaving the other two leaflets intact. The leaflets may fall off one by one and then the stalk. Usually, however, the leaf, falls as a whole. Sections of these affected parts show hyphæ of Phytophthora inside the tissues and in direct connection with the sporangia on the outside. It may happen that the leaf becomes yellow with no particular spots on any part, or the leaf may be quite green when it falls. In such cases sections of the leaf-blade, the leaf-stalks, and the twig that bears them may not disclose the presence of Phytophthora. Yet looking backwards along the branch one invarably finds a dead branch, or branch scar and sections reveal the presence of the fungus at the junction of the dead and living tissues. Many examples carefully examined have established this observation. In such cases the mycelium is not in the leaves but in the branch. It would seem that the stimulus of the fungus within the branch causes it to shed its leaves.

During the time when the disease is spreading rapidly, the young leaves in an opening bud are completely infected by mycelium of Phytophthora. They become discoloured and flaccid and the leaf bud dies.

On the fruit:—This year a careful look out was kept for the commencement of the attack on the fruits on an estate which had had fruit-rot and abnormal leaf-fall for three years. In March the trees were in blossom and fruits were forming. Faded male and female flowers became mouldy and a fungus with a colourless *penicilliate* fructification was commonly found on them, but no trace of Phytophthora was present. The fresh flowers, both male and female, were not infected by any fungus nor were the young fruits. Sections of the stalks of the flowers showed no hyphae in the tissues. Thus there was no indication of the presence of Phytophthora on the flowers and young fruits even on trees that had had a severe fruit-rot and a copious abnormal leaf-fall during the previous year's monsoon. These trees too had branches that had died back and that contained living mycelium of Phytophthora in their tissues. I have a note of having found the mycelium of Phytophthora in a previous year on the flowers, but have mislaid the material, so this point needs further observation before a general statement can be made regarding the presence or absence of the fungus on the flowers of Hevea. This year at any rate it was not on the flowers on the estate on which it was looked for, and till the 12th of June the fruits were still free from the fungus. This was not because the fungus was lying inactive in the fruits, but because it was not yet on them as the following experiments show. 24 fruits washed in boiled water and wiped dry with sterile cloths were kept, 6 in the air, 6 in a closed vessel and 12 in moist chambers, but Phytophthora did not develop nor was the mycelium found in the fruit or in the stalk. Yet 12 fruits kept in a moist chamber and inoculated from a pure culture of Phytophthora that was kept alive from the previous year all became discoloured in from 3 to 7 days. The fruits were capable of being infected by the fungus, but it had not got to them.

On the bark—After the monsoon has set in well and the trunks of the trees are continuously wet, a rot sometimes appears on the tapped surface. Beginning as a small dark spot on the inner edge of the tapping cut it gradually extends laterally and vertically. It runs upwards in little dark streaks. The infected area seldom occupies more than a few square inches. The surface of the dark discoloured patch sinks below the general level of the surface of the bark and the streaks appear as sunken lines. Latex oozes out of the diseased surface and coagulates in small masses which become black. The rot extends right into the bark and destroys the cambium. When tapping is stopped at once, the rot spreads very slowly and does not affect much of the surface, but if tapping is continued the rot spreads along the cut surface and effects a considerable area of the renewing bark. The rot stops with the passing of the monsoon. If the spot is small, the bark is renewed with only a slight bulge; but when the patch is a few inches in area the bark renewal is slow, uneven, and bumpy.

Phytophthora has been found inside such spots. A similar bark-rot has been recorded from Java, Ceylon and Burma. Mr. Dastur in Bulletin No. 14 of the Department of Agriculture, Burma, describes a similer bark-rot which he calls "Black thread disease." He has determined by careful experimental work that a species of Phytophthora is the cause. In Java the cause is also thought to be a Phytophthora. The Mycologist in Ceylon has been unable to find any connection between bark-rot and the canker fungus which is a species of Phytophthora. It is thought to be capable of explanation on purely physiological grounds.

In order to study a fungus one must have it growing alone free from all other living organisms. This we call a pure culture. The fungus was brought into pure culture first in 1915 from sporangia on the fruit and on the leaves. It has been brought into pure culture again this year from the leaf, fruit, branch and from the living part of a branch that had died back. The characters and mode of life of the fungus as recorded last year agree with those of the fungus again brought into culture this year. The fungus found in nature in all parts already mentioned namely leaves, fruit, branches and rotting bark agrees with that in pure culture, so that we are dealing throughout with one fungus, a species of Phytophthora.

In a note in the *Planters' Chronicle* for last year I mentioned that I thought this Phytophthora was Phytophthora Faberi, the fungus thought to be responsible for the disease in Ceylon, but a study of the material I have since got together with the cultures I have made lead me to the conclusion that this Phytophthora is not Phytophthora Faberi but one hitherto undescribed. I shall not trouble you with the technical discussion of this point as it will be published soon. In order to see whether the fungus did actually cause the disease, small portions of it were placed on the different parts of Hevea plants in moist conditions. In order to be brief I shall give you the history of one example only of each.

(*a*) On *leaves*:—A tiny portion of mycelium with sporangia that were discharging spores was placed on each of two leaflets of one leaf of a seedling which was kept under a bell-jar in order to keep the air round the plant moist. Two days after the places inoculated began to show the discolouration. Two days later the spots had enlarged and the leaflets were

beginning to curl while the leaf-stalk was slightly discoloured. Next day both leaflets had fallen. Two days later two other lower leaflets showed signs of infection. Thus in nine days two leaflets had fallen and the fungus had spread to other leaves.

(*b*) A *leaf-stalk* was inoculated: In nine days a spot was produced and on touching the leaf it fell off. Sections showed that the fungus was inside.

(*c*) Healthy *fruits* were inoculated and showed the dull ashy-grey appearance on the surface in from 3 to 7 days. In one case 5 days after inoculation the fungus had penetrated through the soft tissues along that part of the stalk embedded in the fruit and into the seeds.

(*d*) A *young opening leaf bud* was inoculated, and in three days the leaves showed signs of being infected. In 10 days the leaves were dead and fungus had penetrated the stem immediately below the bud.

(*e*) A little of the *bark* above the tapping cut was carefully scraped away exposing the green bark below and was inoculated. When examined on the 7th day, it showed a dark discoloured spot. 14 inoculations were made and 13 became infected. The same was done on other trees but the bark was not interfered with in any way. Then 9 became infected out of 15. The trees were all in tapping and had been tapped on the morning on which they were inoculated.

These experiments have been repeated with the same result, and in every case the mycelium of Phytophthora and its characteristic sporangia found inside the tissue had the same characters as that used for inoculation.

It has thus been demonstrated that this Phytophthora is the cause of all these diseased appearances.

Recently the fungus was tried on Ceara (Manihot Glaziovii) and on the castor oil plant, and both became infected. Discoloured spots were formed on the inoculated places on the leaves. These spread till the whole leaf was infected and the infection passed into the bud, killing it. This shows that the fungus can grow on other plants besides Hevea and suggests that the fungus may have come to Hevea from a plant in the jungle. I have not seen it on any other plant in nature, but my opportunities of seeing it are very few. One planter told me he suspected the Jack, but specimens have not yet been found. I have found the fungus inside the seed that was lying on the ground but this does not seem to be the way in which it is carried, as nursery plants do not seem to be affected. It can, however, be made to attack seedlings as I have found at Coimbatore. It is only during this last year that the life history of the fungus has been worked out in detail so that the discussion of combative measures against the disease is more a suggestion of lines of future work than statement of definite means of preventing the disease. In this connection there are two main facts to bear in mind, (1) that the mycelium passes the dry weather inside branches that have died back and (2) that the fruits seem to be the propagating centres for multiplying the fungus. This suggests that the branches that have died back and the fruits should be dealt with. In the one case the aim is to stop the fungus from beginning its

activity in the new season and in the other to stop the rapid propagation of the fungus after it has once begun. If all branches that this fungus has caused to die back were removed, say a foot beyond the junction of living and dead tissue, many of the centres of infection that *begin* the new attack of the fungus each year would be destroyed. Now all branches that die back on Hevea do not do so because of this fungus. There are other factors that produce die back *e.g.*, shade causes the lower branches to die and other fungi *e.g.*, Botryodiplodia also do so.

There is no simple field method of distinguishing between these various causes. So that, if die back branches are to be removed then all will have to be removed irrespective of the causing factor. To do this to a very large extent is possible, but it will certainly be costly. It is being tried on one estate and it is hoped that it will be tried on a large scale in several estates to decide its feasibility with regard to cost and its effectiveness in stopping or reducing the *material* attack. It has also been shown that the fungus may invade a branch along the fruit-stalk and that the fruit-stalks of rotted fruits may remain on the tree through the dry weather till the beginning of the monsoon. This is a real difficulty in the way of preventive measures. I doubt whether it is possible to remove these fruit stalks even when the trees are bare in December and January and even if this were done there is the fact that the mycelium of the fungus invades the branch from which the fruit stalks spring, at the point of insertion of the stalk. I have not actually found the fungus starting from this point in the early part of the year, but I have no doubt but that it does so. Removing die-back branches would not touch this source of re-infection. Removal of the fruits before the break of the monsoon or at latest during the first fortnight of the monsoon, though this is cutting it rather fine for safety, would stop the rapid propagation of the fungus that begins about 15 days after the monsoon has set in. This would also get over the difficulty mentioned in the last paragraph with regard to infection by fruit stalks. If the fruits are not there to become infected the fruit stalks would not carry the mycelium of the fungus into the branches. To remove fruits from a rubber tree is not an easy matter, as they are scattered over the young twigs towards the ends of the branches. So far as my observations go the fruits seem to be more plentiful in the lower rather than on the higher branches. But, of course, I have not seen old rubber (*i.e.*, more than 10 years old) and do not know whether this holds good generally.

At any rate it is substantially true for rubber in South India at the present time. Removal of the fruits is not an impossible task though to do it thoroughly will be expensive. Such an experiment is being tried on an extensive scale on one estate.

There is another possibility, *viz.*, the destruction of the flowers in order to prevent the formation of fruit. This might be done by mechanically removing the flowers or spraying them with a chemical that would kill them. Either of these would be rather a difficult operation to do well, still they are worth a trial and arrangements will be made next year to do this on a large scale.

It may be that any one of these three suggested methods of combating the disease *viz.*, removing branches that have died back, removing fruits or destroying flowers alone will not be found to be effective. It may be that a judicious mixture of all of them will prove more beneficial. Next year it is hoped to devote more attention to this aspect of the subject.

MARKETS, PRICES AND STATISTICS.

Coffee.

Brazil receipts to 11th August have been :—

1916.	1915.	1914.	1913.
2,043,000	2,463,000	1,483,000	1,747,000

Offerings in auction have been as follows :—

	8—11 August.	Since 1st Jan.	Last year.
East India	302	26,906	37,688
Costa Rica	185	89,335	87,829
Other Milds	296	58,174	126,860
Brazil	2,730	66,785	98,991
Robusta	Nil.	1,351	12,526
B. E. A. & Uganda	Nil.	7,369	10,207

The Board of Trade figures showing duty payments to 31st July are rather disappointing. The Wharehouse deliveries fnr home consumption showed some increase on last year, but the duty paid figures are only 8,618 tons against 9,522 last year and 8,103 in 1914. Up to the imposition of the increased duty the deliveries this year were considerably in excess of 1915, but of course a good deal of that was in anticipation of the Budget.

Tea.

The following figures are published by the Indian Tea Association showing the Export of Tea :—

	1916.	1915.
Sailings to Great Britain—		
From Calcutta in July	18,195,171	11,242,820
From Chittagong in July	6,058,068	6,329,773
From 1st April to 31st July	49,048,320	35,841,981
Sailings to Australia and New Zealand—		
In July	125,710	1,728,975
From 1st April to 31st July	408,746	1,782,058
Sailings to America—		
In July	201,609	471,178
From 1st April to 31st July	505,712	724,198
Sailings to other places—		
In July	660,381	594,623
From 1st April to 31st July	8,133,284	2,786,998
Sailings from South India—		
In July	1,374,510	1,806.577
From 1st April to 31st July	6,346,085	7,323,081
Total sailings—		
In July	26.615,459	24,173.946
From 1st April to 31st July	64,442,147	48,458,316

The following were the sailings from South Indian ports during July :—

From Cochin.	
To London	621,462
From Tuticorin.	
To London	220,055
To St. John, N. B.	383,675
To Colombo	85,876
To Bombay	44,884
From Tuticorin *via* Colombo.	
To Moscow	10,700
From Calicut.	
To Colombo	7,858
Total ...	1,374,510

The Export of Tea from Ceylon from 1st January to 21st August was, black 126,722,187 lbs. and green 2,247,573 lbs. the corresponding figures in 1915 being 132,815,956 lbs. and 3,248,351 lbs. respectively.

The market for the week ending 14th August was rather irregular, good qualities steady, common again lower. The following prices were obtained for South Indian Teas on 14th August.

	B.O.P.	B. P.	Pek.
TRAVANCORE.			
Poonmudi	9½	9½	9¼
Haileyburia	9½*	9*	9
WYNAAD.			
Askern	—	9¼	9¼

Rubber.

A fair amount of business carried prices to 2/4½ for Crepe and 2/4 for Smoked sheet, but things are quieter again and quotations about 1¼*d.* lower.

The following are the figures for the Imports of Rubber into the United Kingdom during July, in centals of 100 lbs :—

	1916.	1915.
From Dutch East Indies	8,689	5.572
From French West Africa	867	1,487
From Gold Coast	1,410	480
From Other countries in Africa ...	7,399	6,763
From Peru	271	414
From Brazil	10,925	18.981
From British India	1,516	1,191
From Straits Settlements	28,320	36,303
From Federated Malay States ...	38.916	19.349
From Ceylon	13,269	8,622
From Other Countries	2,853	2,975
Total...	114,435	102,137

The following are the figures for the Rubber re-exported from the United Kingdom during July, in centals of 100 lbs :—

	1916.	1915.
To Russia	5,622	6,855
To France	19,275	17,659
To United States	30,357	83,613
To Other Countries	16,789	15,933
Total...	72,043	124,060

R. D. A.

CORRESPONDENCE.

Waresley, Hartlebury, Worcestershire,
13th August, 1916.

THE EDITOR,
Planters' Chronicle.

Dear Sir,—I was sorry to see in the *Chronicle* of July 8th, that C. E. M. Browne had been severely wounded and hope he is all right by now.—I wonder where H. Browne is?

I've been back in Blighty since May 13th and my leave doesn't expire till the end of this month, quite a useful slice of leave. Was sent out at the end of January for the second time so had a moderately long stay at the Front. We had a vile time during February—March, 6 weeks of practically continuous snow. The trenches were vile and the cold was chronic! Met Dixon out there, he was in A Coy. and our platoons joined each other in the trenches. Last time I saw him we were having a pretty exciting time with "sausages." We were holding a brute of a salient and the playful bosche became a d — d nuisance. He considered our salient quite a superfluous attempt at landscape gardening and spent most of his spare time trying to erase it with sausages, trench prawns, 5·9's and the other little toys his soul delights in.

The big push seems to be going well—wish I wasn't out of it.

We have lost terribly but for once we seem to be doing pretty "bon" and the casualties have not been suffered in vain.

All the planters I have met are very grateful to the fellows, who have not been so fortunate as to join up, for the War Fund. It is extremely good of them to remember the men who have been luckier than they in having been able to take an active part in the show. Close on ½ lakh is a pretty good figure for so small a community to collect!

A. P. KINLOCH.

(Extract from "Times of Ceylon" 19th August 1916.)

The Labour Question.

Sir,—A twinge of the *cacoethes scribendi* induced by the perusal of your footnote to the letter of "Touchwood" in your issue of 12th instant is is my excuse for putting in a word on the subject. In my humble opinion you put the whole case in a nutshell in the words: "Competition by advances is demoralising both to the coolies and to the employer. It is also immoral." Were this view generally accepted and acted upon things would not have come to the pass at which they now are. It is the failure to give this fact due recognition that has hitherto rendered all our efforts, Labour Commission P. L. F. and other expedients abortive. Had we taken the ground, years ago, that the system of high advances for local labour is what you describe it, as demoralising to all concerned it is more than possible we should not now be landed in the Augean mess in which we find ourselves, and which baffled the powers of that Hercules Sir Hugh Clifford. Once adopt this fundamental principle and matters are in a fair way towards solution. Doubtless a great deal is involved: but when the core is extracted healthy tissue forms naturally. It requires, however, that public opinion should prove antiseptic enough to destroy the microbes of company-promoting and vested interest, which are so fatal to all social amelioration.

Yours etc.,
CHAS. M. HENRY.

August 14th.

The Planters' Chronicle.

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THE U. P. A. S. I.

(INCORPORATED.)

Contents.

The Deputy Director of Agriculture, Planting Districts, publishes under the Scientific Department an article first of all dealing with the Analytical Branch. It is only by the continuous support by Planters themselves that this branch can become self-supporting as emphasized by the Deputy Director. Notes on Ashes as Fertilisers and Carbide Calcium Residue complete his article.

Through the courtesy of the R. G. A. we are permitted to publish an article headed "Metrolac" which should be of interest to Rubber Planters. The name of the Firm and address is given at the bottom of the article and it will be noted that 25% discount is allowed to members of the Rubber Growers' Association.

A long and interesting letter will be found in the Correspondence column from Mr. Leslie Rogers on Cultivation and Spraying of Coffee. The suggestion that the Scientific Department should issue a descriptive list of friendly and inimical trees and plants will doubtless be noted by that Department, but it will require the active co-operation of planters themselves to bring it to a successful issue.

We trust that some one will reply to Mr. Hayward enquiring as to the cause of turned "Tap roots."

Dr. Coleman replies to an "Old Planters" letter in this issue.

SOUTH INDIA PLANTERS' WAR FUND.

	Rs.	A.	P.
Amount previously acknowledged	48,819	12	8
Mr. V. L. Travers Drapes...	10	0	0
Mr. R. Lescher	25	0	0
Mr. D. V. Crowe	7	8	0
Mr. A. A. Robb	25	0	0
Mr. C. K. Pittock	25	0	0
Mr. C. L. Dobbie	10	0	0
Mr. J. E. Scott	5	0	0
Mr. L. C. Turner	10	0	0
Total...	48,937	4	8

SCIENTIFIC DEPARTMENT, U. P. A. S. I.

Analytical Branch.

At the Annual Meeting the reason for the delay in making analyses of samples submitted to the Laboratory in Bangalore were explained. The delay was unavoidable and due to an accumulation of work while the post of Assistant Chemist was being filled.

The Deputy Director of Agriculture, Planting Districts, is now glad to announce that all arrears of work have been dealt with and that samples now sent to him for analysis can be promptly dealt with.

It is earnestly hoped that planters will make full use of the facilities afforded them by this Branch of the Scientific Department of the U. P. A. S. I. The scale of fees charged to members of a District Planters' Association is extremely low and the success of this Branch of the Department entirely depends on the amount of work sent in, only if this is enough to keep the Assistant Chemist fully employed can the venture be a financial success.

Ashes as a Fertiliser.

A number of samples of different kinds of Ashes have been examined in the laboratory during the year and they appear to be used fairly frequently on estates now that there is a shortage of Potash.

The benefit derived from Ashes is due to the combined effects of the very finely divided Calcium carbonate and Potassium carbonate which they contain.

The following table shows the composition of some of the samples examined :—

Ashes derived from.	Potash.	Phosphoric acid.	Lime.
Tobacco Waste ...	26·96	...	...
Galinsoga parviflora ...	24·27	4·28	5·94
Cow Dung ...	16·49	1·40	3·50
Wood Ashes ...	4·37	3·66	36·06
	3·83	1·73	38·33
	3·73	3·42	47·85
	3·05	2·51	7·47
Jungle Wood ...	2·95	...	...
Etzel Grass ...	4·10	...	6·16
Paddy Husk ...	0·89	...	...
Bracken Fern ...	1·97	...	...

It will be seen that the composition of these Ashes varies a great deal, especially the composition of Wood Ashes depending on the material from which they are made. This latter class of Ash contains a very large amount of Lime.

As wood matures the proportion of Potash and Phosphoric acid decrease while that of Lime increases so that the ash of old wood is not so valuable as that from young branches and leaves, in which Phosphoric acid and especially Potash largely occur, and whenever possible such material should be chosen in preference to old wood for the preparation of Ashes for agricultural purposes.

The Ash from Tobacco Waste is a most valuable source of Potash and one which should be developed.

The *Chemical News* of 2nd June contains an article by Mr. Burrell on "the National Waste of Tobacco Ash" from which the following extract is quoted:—

"It is well known that all parts of the tobacco plant are rich in potash. In America the stems and waste from the factories are already being utilised.

"The portion used for smoking is the leaf, and it may be stated that in round numbers the ash (including unburnt tobacco) from a pipe, cigar, or cigarette is about 30 per cent, and that one-fifth of this, or 6 per cent, is potash; or in 100 parts of ash there are potash salts equivalent to 20 parts of potash.

"Tobacco ash is thus extremely rich in potash. It may be regarded as the by-product in the operation of smoking, and at the present time this valuable by-product is being completely wasted, whereas by a little organisation a great deal of it might be saved and used as a source of potash. Tobacco ash also contains another fertilising ingredient *viz.*, phosphoric acid, to the extent of about 5-6 per cent.

"It is I think a matter of common agreement that as a nation we shall in the future have to practise the most rigid economy, and that we must try to reduce our imports as much as possible. One of the imports that could be reduced or stopped are the German Potash salts.

"We have commenced to make our own dyes, chemical and optical glass, porcelain and filter papers: then why not try to be independent of German potash and stop the daily waste of potash in tobacco ash and household vegetable refuse. The latter does not, however, come within the scope of this note.

"By the systematic collection of tobacco ash from pipe tobacco, cigars, and cigarettes, hotel and restaurant keepers would be doing a national service and at the same time add to their incomes. I would suggest that every hotel, restaurant, and public house should have its tobacco ash tub, into which tobacco-ash trays from the smoke room, &c. should be emptied, and that they form a combination for its collection and sale to the artificial manure maker or the manufacturing chemist.

"The material is there; in any case it has to be collected; but instead of throwing it away, as at present, it should be utilised.

"Every district should have its potash recovery department, which should work up not only tobacco ash but household vegetable refuse and vegetable waste from the markets and greengrocers' shops. Such a scheme would help to provide employment for our own people and to materially lessen our imports.

"In order to put the matter as fairly as possible the following illustrations are given:—

"An ordinary sized cigar will measure about 4¾ inches by half an inch, and will weigh about 106·5 grains. If carefully smoked it will take about one hour to burn and will give about 32·3 grains of ash, of which one-fifth, or 6·5 grains, is potash.

"An ordinary sized cigarette will weigh about 27 grains, will take about twenty minutes to burn, and will give about 8·5 grains of ash, of which one-fifth, or 1·75 grains, is potash.

"An ordinary sized pipe will hold about 25·5 grains of tobacco, will burn for about twenty minutes, and will give about 8·0 grains of ash, of which one-fifth, or 1·60 grains, is potash.

"Now take some results of systematic collecting :—

1. Tobacco ash and unburnt tobacco from the smoke room of a club, collected for eight days, weighed $9\frac{3}{4}$ ounces.

2. From the lounge of a large hotel, collected for four days, weighed 13 ounces.

3. From a large restaurant, collected for ten days, weighed 2 lbs. 8 ozs.

4. From a music hall, one-tenth part of the auditorium, one performance only, weighed four ounces.

"If it is remembered that this ash is being produced all over the country day by day we can begin to appreciate the quantity of valuable matter that is being wasted.

"By the kindness of Mr. Murgatroyd, of Messrs. Hardy and Co., tobacco and cigar importers, I am enabled to give the actual amount of tobacco and cigars consumed in the United Kingdom for one year, March 31, 1913, to March 31, 1914. Tobacco was 98,412,412 lbs., the total population being 46,407,037, or an average consumption per head of the population of 2·08 lbs. During the same period the imported cigars consumed weighed 1,331,802 lbs.

"I have converted Mr. Murgatroyd's figures into tons, so as to be more easily grasped. The total consumption of tobacco and cigars in tons comes to (in round numbers) 44,529. This when burnt will give 13,359 tons of ash. If we assume that the ash contains one-fifth of its weight of potash (which is a low estimate) we get 2672 tons of potash, and as kainit only contains 12·5 per cent. of potash we may say that we are annually throwing away potash equivalent to 21,376 tons of kainit. In the spring of 1914 the cash price of kainit at Goole was £2 7*s*. 6*d*. per ton, so that this quantity of kainit would be worth nearly £51,000. In the spring of 1915 it was worth nearly three times as much.

"From these figures there would, of course, have to be considerable reductions for unavoidable wastage."

Galinsoga parviflora is a very common weed on Tea and Coffee Estates and one which should be encouraged and always dug in when found so as to conserve its valuable constituents. My attention was first called to the high Potash content of the Ash of this plant by my friend and colleague Dr. Harrison, the Government Agricultural Chemist. The sun-dried plant contains about 18-20% of Ash which Ash contains about a quarter of its weight in Potash. Another valuable form of Ash is that derived from Cow Dung or Bratties.

The Ashes of Bracken Fern are disappointing. The Ash of Bracken Fern was recommended as a source of Potash in England and said there to contain 20% or more of Potash, but two samples examined here contained a very large proportion of insoluble matter and very little Potash. The reason for this is not clear, it possibly has something to do with the soil on which the Fern is growing.

It has often been stated that Soda may be substituted for potash. Whilst in a measure true this bald assertion needs some qualification. When in any soil certain mineral elements of plant food are lacking they may in some degree, but not in their entirety, be replaced by other nearly allied elements, and to some extent soda replaces potash, but not altogether and not sufficiently to render the latter unnecessary. The idea could be easily carried too far. Our soils are not as a rule lacking altogether in Potash and comparatively small applications are found in practice to suffice. Sources of Potash deserving consideration at a time like this are Ash of all kinds.

In any system of manuring at the present time it would seem that the safest and most economical plan to adopt is to Lime the soil and then apply organic material which on decomposition supplies Nitrogen, and then Phosphates and any Ash available.

The effect of the Lime followed by Phosphates will be to materially hasten the decomposition of Silicates and insoluble forms of Potash in the Soil with the production of Potash available to the plant. At the same time the Phosphates are most essential when the berry is the chief object of attainment in the crop.

Calcium Carbide Residue.

On page 107 of the present volume of the *Planters' Chronicle* a note on Carbide refuse as a fertiliser was published. *The Journal of the Board of Agriculture* (*England*) for March contains the following on this subject :—

"The residue left after acetylene gas has been made from calcium carbide consists substantially of calcium hydrate, *i.e.*, slaked lime, containing from 30 to 40 per cent. of water. The dry matter contains 60 per cent. or more of CaO (as compared with 80 to 90 per cent. in the case of a good quicklime).

"The impurities usually found in calcium carbide are small quantities of silicon, sulphur, iron, phosphorus and carbon, but not such as will render the residues generally unsuitable for agricultural purposes if proper care is taken.

"A sample of *fresh* calcium carbide residue recently examined at the Government laboratory was found to contain small quantities of calcium sulphide and calcium sulphocyanide, but no other substance likely to be poisonous to plant life was detected. In a *weathered* sample of the same residue only a faint trace of calcium sulphide was found indicating that exposure rapidly oxidises the sulphide; and only 0·001 per cent of calcium sulphocyanide was found, it being probable that, since the latter is soluble in water, the rain washed out the greater portion of this substance during exposure. The residues from generators are generally put into heaps, but it should not be assumed that such heaps become weathered. If little or no attempt is made at aeration, the great bulk of the sulphide probably remains unoxidised after the lapse of a considerable time owing to the caking of the hydrate on the outside of the heap.

"On weathering, the calcium hydrate would, to some extent, probably be converted into carbonate, but the carbonate would be in a finely divided condition and readily decomposed by soil acids. Its action would therefore differ only slightly from that of hydrated lime.

"In substituting calcium carbide residue for lime it is recommended, therefore, that use of *fresh* carbide residue should in all circumstances be avoided.

"After exposure to the weather, the carbide residue is best applied to fallow ground during the winter; trials on a small scale should be made before any growing crop is dressed with the residue.

"The carbide residue may be applied in the same quantities (when dry) as ordinary quicklime. It should not be mixed with farmyard manure, or loss of ammonia from the latter will result; indeed, it should be put on the field a few months before the farmyard manure."

RUDOLPH D. ANSTEAD,
Deputy Director of Agriculture, Planting Districts.

METROLAC.

The following information is published by courtesy of the Rubber Growers' Association (London) for the information and guidance of Rubber planters:—

The "Metrolac" is an instrument for recording the amount of dry rubber in latex.

Experiments have been carried out for some years by the Scientific Officers of the Association in Malaya and Ceylon, and approval has now been given by these Officers to a type of instrument which is reported as being satisfactory for all ordinary purposes.

The "Metrolac" possesses the important feature of recording the actual weight of dry rubber in pounds and ounces per gallon of latex.

The following are some of the uses to which the "Metrolac" may be put. The value of the instrument, however, will depend to some extent on local conditions.

(1) To Check the Addition of Water to Latex.—Results have shown, and it is believed it is now generally admitted that it is advantageous from all points of view to use little or no water in the collection of latex. The "Metrolac," by giving the amount of dry rubber in the latex, also indicates whether or not water has been added. The amount of dry rubber in latex to which water has not been added will vary with local conditions, methods of tapping, etc., but is usually from 3 to 5 lbs. per gallon. The latex of any coolie suspected of having added water can be tested with the "Metrolac" and compared with the latex of other coolies.

(2) Where the addition of some water to the latex is allowed, the "Metrolac" will enable a check to be kept on the amount of water added. The addition of small quantities of water has relatively little effect on quality, but where water is allowed some check is necessary to prevent the use of excessive quantities.

(3) Bulking.—Where latex is bulked (and this procedure is strongly recommended), tests with the "Metrolac" enable the latex afterwards to be watered down to a standard rubber content so that, for instance, in sheet making all sheets are of uniform size and thickness, are smoked equally and are generally uniform.

(4) Closely connected with bulking is the correct apportionment of acid for coagulation, sodium bisulphite, etc. The proportions of these reagents necessarily depend on the dry rubber content of the latex. The "Metrolac" enables this to be rapidly ascertained and so leads to economy and uniformity in the use of coagulants, sodium bisulphite, etc.

(5) Payment by Results—this mostly applies to Ceylon. The amount of rubber brought in by any coolie can be determined by testing with the "Metrolac" and then weighing or measuring the volume of the latex. This has the advantage that, if desired, the latex can be bulked before coagulation and secondly, tapping coolies do not need to enter the factory and follow their rubber round in course of washing and creping. It also enables payment by results in the case of rubber for sheet manufacture.

The instrument is graduated in lbs. and ozs. per gallon; this serves well for testing latex in bulk. For paying coolies by results it is necessary to measure the latex in units smaller than the gallon and the unit suggested is the half-pint. The calculation is quite simple, for as there are 16 ozs, to the lb. and 16 half-pints to the gallon, the figures on the instrument will correspond to ozs. to the half-pint as well as to lbs. to the gallon.

It is not always necessary to test each coolie's latex for, provided that no water has been added, the quality of the latex brought in from the same part of the Estate by different coolies will not, as a rule, vary appreciably. Hence it will be sufficient to test the latex of one or two coolies with the "Metrolac."

As a coolie will never know whether his latex will be chosen for testing, he will not run the risk of adding water or, should he do so, will sooner or later be detected.

(6) By means of the "Metrolac" it is also possible to forecast the daily output of dry rubber on the estate.

(7) In the case of trees which are tapped too severely or where the resources of the trees are overstrained, the amount of rubber in the latex tends to fall. A check may easily be kept on the quality of the latex by means of the "Metrolac," and, if necessary, a field may be rested or the system of tapping modified at an earlier stage than would otherwise have been.

The "Metrolac" is made of brass gilt, and measures about 10 inches long. It is supplied complete with measuring glass for testing and packed in a box with full instructions for working.

The price of the instrument in Great Britain is 50*s*., and a discount of 25 per cent. is allowed to members of the Rubber Growers' Association. Packing and freight extra.

The sole manufacturers are Messrs. Dring & Fage, 56, Stamford Street, London. Orders should be placed with the firm direct.

Note.--The Trade Mark "Metrolac" is registered in Ceylon, Federated Malay States, Johore, Straits Settlements, India, Dutch East Indies, and British North Borneo.

A good illustration of the direct relation which obtains between the play of animals and the vital activities of life, such as the capture of agile prey, the avoidance of their most formidable enemies, or conflict with rivals, is furnished by Mr. C. J. Carroll in the *Irish Naturalist* for May. Herein he describes the behaviour of the raven when attacked by the peregrine. On such occasions every effort is made to escape by flight, but if overtaken the pursued throws himself on his back, and opposes beak and claws to his pursuer, thus, time after time, beating off the attacker. So soon as the young of the raven are able to fly the parents put them through a course of training in these tactics, acting the *role* of the peregrine until efficiency is attained. "At first the young are stupid and clumsy, but they soon learn to avoid the onslaught by turning over and presenting their claws, or by rising high in the air."—*Nature*.

CORRESPONDENCE.

Cultivation and Spraying of Coffee.

Sir,—I see that I am taken to task by some of your correspondents for saying that the late Conference tackled the subject of coffee disease from the wrong end; but surely it is obvious that it has done so, when the pathology of all diseases teaches us that to bring about a radical cure, the cause should be dealt with first and not the effect. The cause in the case under reference is, I maintain, the marked and steady decline in the vitality of coffee, produced by artificial conditions antagonistic to healthy growth: these adverse conditions being largely due to unsuitable cultivation and empirical treatment. It would therefore have been more practical to have first discussed up-to-date principles of cultivation in its broadest sense, and then after that to tackle the less important question of how to ameliorate and check casual attacks of superficial diseases that come from outside sources. Spraying with fungicides such as Bordeaux Mixture, is as old as the hills; but it has never yet been a complete success by itself. All authorities on agriculture and the physiology of plants are insistent that plant diseases can only be combated by first producing a healthy plant. Having attained this end, if then it is attacked by external epidemics, such as leaf disease in Coffee, it is admitted that spraying with fungicides undoubtedly palliates, and very materially helps the healthy plant to recover itself. But no such beneficial results can be expected in anaemic and debilitated plants; and those who have studied the history of coffee in Ceylon and India, and examined its present condition in the latter country, must realise that a very considerable proportion of our coffee area is approaching a period of exhaustion and decline, which inevitably leads to disease. It was in 1869 I believe, that Hemileia vastatrix was first noticed in Ceylon. Many years ago I came across the reports of old tea planters of Northern India, who had visited Ceylon in the fifties and sixties, and these reports showed that the writers were then convinced that the Ceylon Coffee would be exterminated before many years were past, by some insect pest or fungoid disease; and they gave as their reason, that the impoverishment of the soil by bad cultivation had so reduced the vitality of the plants that they could not possibly withstand the ravages of any epidemic. We all know how literally the prediction was fulfilled; and may not the marked increase of late in leaf and other diseases be the writing on the wall for Southern India, warning us to be prepared against a similar fate?

On looking up records referring to coffee growing during the past half-century, the most remarkable fact that obtrudes itself is the very scanty cultivation coffee has hitherto received. The physical condition of the soil does not seem to have been considered a matter of much importance. Broadly speaking, all that appears to have been done, was to occasionally light hoe the crust, scrape the surface, hand-weed, sickle, and mulch, especially mulch. As long as the hard ground was kept clear of weeds and well mulched, all agricultural requirements were considered to have been fulfilled. The spacing between plants has been too close, and the pruning too heavy and fanciful. Even the bulk manure has been mostly applied near the surface, while powerful chemical manures have been used on deteriorating plants, that have only tended to hasten their end. All this time millions of tons of vegetable matter have been left lying on the ground, dessicated by the sun, and rotted and washed away by the rain. This vast quantity of organic matter might easily have been converted into humus of incalculable value, whereas the main purpose it has hitherto served is to have formed ideal conditions for breeding myriads of spores and insect pests. The

shading operations have also been on empirical lines, confined solely to the abstract production of shade, without consideration of other results, such as the impoverishment of the soil and the dissemination of disease by the wrong kind of tree. Such being the past record, only drastic measures can now save the situation, and it is evident a revolution in our methods is urgently called for.

According to the old adage, an ounce of practical experience is worth a ton of the wisest theories; and I would therefore suggest that every planter, to convince himself of the necessity for changed methods, should set aside for experimental purposes an acre or two of level or comparatively level land of average quality. The following system might be given a fair trial: all results being annually reported to the Scientific Department. In these experimental plots let the spacing be about eight feet. Prune as lightly as possible, conforming to the natural shape of the bush. Fork one foot deep at the beginning of the winter, turning up the clods and burying everything. Follow soon after with one or two light mamooti hoeings, pulverising the clods, and applying bulk manure, such as cattle, green manure, composts, etc. Chemical manures should only be applied after the physical and mechanical conditions of the soil have been more or less perfected. During the heavy monsoon period when the coffee rootlets are developing, do not disturb the soil, but handweed round each plant and sickle down the rest, spreading the cut weeds over the ground and not gathering them as mulch heaps, as I concur with Mr. Danvers that old decaying mulch is a potential source of many of our diseases. Towards the end of the monsoon when the surface is showing signs of hardening and caking, do one or more light mamooti hoeings, without pulverising the small clods. This last operation will bring you back again to the annual deep forking at the beginning of each winter. With all this stirring of the soil, it might be thought that there will be enormous erosion and wash of tilth in the rains, but practically no such results take place, if there is an intelligent system of deep drainage, and if the digging is done with judgment at the proper time of the year. The two essentials that must be aimed at, are the formation of humus and the continuous supply of fresh nutriment to the growing rootlets, remembering always that no other operation in the field can replace good tillage. If after all this systematic cultivation you have occasional sporadic attacks of leaf disease, then by all means bring to your aid every external method of suppression, especially spraying, which is a helpful adjunct to good cultivation.

I may here mention that Hemileia vastratrix is not a new disease. It was noticed in Indian coffee as far back as 1870. As a matter of fact it is an indigenous disease, and its origin has been traced to many wild plants in this part of the country. There are, for instance, Hemileia canthi, a parasite found on Canthium campanulatum, and five or six other varieties of the same plant; and Hemileia Woodii is found on two species of Vangueria. Both these parasites are capable of infecting coffee, and are considered to be the parent sources of Hemileia vastratrix. In fact of late these parasites are believed to be one and the same, and that the very minute difference between them is solely due to the slightly different hosts on which they appear. Now the canthiums and vanguerias belong to the same order of plants as coffee, *viz.*, the Rubiacae; and it is well known that allied species of plants not only use up more or less the same nutriment from the soil, but are also subject to more or less the same diseases. It therefore follows that to reduce the possible sources of coffee diseases all Rubiaceous plants should be rigorously

excluded from coffee areas. To this order belong among others, the well-known gardinias and all the varieties of cinchonas. To carry this argument to its logical conclusion, only leguminous, that is pod-bearing, plant life should be utilised for shading and green manure, while the rubiaceous shrubs and trees should be exterminated as dangerous, and all the other numerous orders should be ignored as useless. But it may well be asked how the average planter can be expected to identify these two orders, and differentiate between the most beneficial, and the indifferent in each order? May I suggest that here our Scientific Department could give most invaluable help by issuing a description list of Leguminous and Rubiaceous trees and plants, both introduced into and indigenous to Southern India. Similar lists might at the same time be prepared for Tea, to which the Leguminous Order is also known to be beneficial; but here the planter would have to avoid all plants allied to tea, as many of these are the original sources of tea diseases. The objectionable order in this case would be the Ternstromiaceae, which includes, besides tea, the well known Camellia family. These three preliminary printed lists might later on be amplified, and illustrated to facilitate identification with plain outline drawings of the leaves, flowers, and seeds of each plant referred to, and thus a ready reference guide would be available to the whole planting community. There does not appear to be any insuperable difficulty in producing a pamphlet of the above description, as the Scientific Department could safely count on the assistance of the planters themselves in the way of descriptive notes, dried specimens and illustrations, etc. May I hope the idea will meet with the approval of our scientists, and thus enable them once more to demonstrate their practical usefulness to the Planting Industry.

J. B. LESLIE-ROGERS.

Ootacamund.

Chickanhally, Belur P. O.,

THE EDITOR,
Planters' Chronicle,
Bangalore.

Supplying vacancies in Coffee.

Dear Sir,—I want the advice and experience of some of my brother planters as to the best way to accomplish this and shall be obliged if you can find space in the *P. C.* for this rigmarole with the hope that some successful planter may put me and perhaps some others in the right path as I must confess my past attempts are a failure.

If any one had asked me a couple of years ago if I considered basket plants a success I should have answered in the affirmative but it suddenly dawned upon me that the plants were there all right, but not a success, since when I have been pulling them up right and left and the result has been a terrible shock as an enormous number of them had turned tap-roots (many readers will at once say "bad planting"). Granted a certain number are due to this cause I am convinced it is not the sole reason. When I first started planting I was shown the uselessness of a plant with a turned tap-root and I have always tried my best to avoid it. For the

last 6 or 7 years I have entirely used basket plants for supplying purposes as they do not require much rain to settle them and by planting in August or early September one avoids the heavy drip from the shade trees during the heavy monsoon. To make sure the tap-root was not turned I used to have the bottom of the basket cut off before planting about an inch but the idea of a turned root still worried me so the last few years I have had about 3 inches cut off leaving about a 6 inch basket but with no better result and this latter system seems to have caused another trouble as I find numbers of the plants have grown two tap-roots which I put down to too severe pruning of the tap-root. I have made enquiries and have been told that there is no harm in two tap-roots but am afraid my experience does not prove this as in many cases the roots are entwined and tied in knots which I cannot think is conducive to the healthy growth of the plant. This year I am planting whole basket only nipping off any roots which appear outside the basket but I feel very doubtful of the result. I suggested to Mr. Anstead last year that filling supply pits when the soil is too damp might have something to do with it and he thought it might be so. I am stopping this but as it takes time to prove, I am writing this in hopes some one may enlighten me further on the matter.

Yours faithfully,

C. J. HAYWARD.

Office of the Director of Agriculture in Mysore.
Bangalore, Dated 7th September, 1916.

To

THE EDITOR,
Planters' Chronicle.

Planters and Agriculture.

Dear Sir,—Your paper of the 2nd instant contains a letter criticizing remarks made by me at the recent Annual Meeting of the U. P. A. S. I. These criticisms are very welcome to me and express views which I feel sure are held by many planters.

The second paragraph of your correspondent's letter is not quite clear to me. If he means that I have not seen planters interesting themselves in the development of Agriculture outside of their own particular line, I can only say that I have received a number of enquiries from planters for advice and assistance in the growing of so called ryots' crops and more than one planter has already expressed his willingness to carry on demonstration work in co-operation with this Department. On the other hand had I thought there was no scope for the extension of this sort of activity, I naturally would not have spoken as I did at your Annual Meeting.

Your correspondent gives instances of a number of failures where attempts have been made to teach the ryots something more than their forefathers knew. I could of course multiply the number of examples he gives many times but I could also tell him of ten successful demonstrations for every failure. He instances the failure of ploughs on paddy lands. During the the past year the Mysore Agricultural Department has sold about 340 ploughs in Shimoga, Kadur and Hassan Districts, more than half that number being used for just this type of work. Surely your correspondent

will agree that the Malnad ryots are too shrewd to waste their money on implements which are useless to them. I may say that practically all of these ploughs are being worked by bullock costing not more than Rs. 100 per pair and frequently costing less.

I do not propose to take up your space by giving a statement of the work that is already in the Malnad of Mysore, any one sufficiently interested will find a short account of it in the Annual Report of the Department which can be had for the asking. No one I think realizes the difficulties standing in the way of progress more keenly than I do and that is the main reason why I am seeking the co-operation of planters. It is quite true that such work can in most cases be carried out only by proprietors of Estates though from what I know I imagine a good many managers are given a sufficiently free hand to allow them to interest themselves in paddy and sugarcane cultivation in a small way. In any case we are fortunate in having in Mysore still a good many resident proprietors. It is also equally true that work of this character can be done only on land under the direct control of planters but as I pointed out in my remarks at your annual meeting many planters have control over fairly large areas of paddy land so there is no real difficulty on that account.

With regard to the question of labour the cultivation of one or two acres of paddy or sugarcane is not likely to affect seriously the labour supply to a large coffee estate.

Yours faithfully,

LESLIE C. COLEMAN.

An instructive example of the manner in which Germany has in the past been permitted to exploit British resources is provided by the management by a German company of the Travancore monazite deposits. The sand was obtained in Travancore at a cost of about 4*l.* per ton and shipped to Germany for the use of the manufacturers of Germany. Only a limited quantity of the sand was allowed to be sold in the United Kingdom and the price of about 36*l.* per ton was demanded. In a paper on the British rare-earth industry, read by Mr. S. J. Johnstone at the Annual Meeting of the Society of Chemical Industry, these and other interesting particulars were given. Prof. Wyndham Dunstan, Director of the Imperial Institute, dealt with the same subject in a paper read to the Indian Section of the Royal Society of Arts on June 1, and printed in the issues of the Society's Journal of July 7 and 14. Thorium, the constituent of monazite of industrial importance, is essential to the gas-mantle industry, which until lately was under German control. Germany, having secured the monopoly of the Brazilian supplies of monazite was able to dominate the manufacture of gas mantles in this country. Owing to the activities of the Imperial Institute, Ceylon was found to supply scattered monazite and thorianite, the richest known ore of thorium containing more than 80 per cent of thoria as against about 5 per cent in Brazilian Monazite. In 1909 monazite sand was discovered on the Coast of Travancore, and the monazite found to contain nearly twice as much thoria as the monazite of Brazil. Thorianite has been secured by the Imperial Institute for British users, by whom virtually the entire output of Ceylon has been taken. Though at first Travancore monazite was worked in German interests, a reconstruction since the war of the company working it will secure its produce also for British Industry.—*Nature*.

The Planters' Chronicle.

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Contents.

The Scientific Department publishes an article on Trees from Different Elevations, a preliminary list having been courteously supplied by Mr. Fischer the Principal of the Madras Forest College. Also an extract from the Board of Agriculture on Granular Nitrolim, and notes on Nitrate of Lime, Tea and Coffee shop in the Nilgiris and Humogen.

The Deputy Director of Agriculture, Planting Districts, has often spoken at Meetings on the value, if not necessity, of pest gangs on Estates, so the account of a lecture on Estates and Pest Sanitation, delivered by Mr. A. C. Tunstall, the Assistant Mycologist to the Indian Tea Association, who carries Mr. Anstead's idea further and speaks of "blight brigades" will be read with great interest by all planters.

In our correspondence columns Mr. Leslie Andrewes in a very interesting letter on Spraying for Leaf Disease, gives a very clear account of spraying operations in British East Africa and pins his faith to the operation, at all events in that colony. He fully admits that conditions may, and do probably, vary there and here. Incidentally in the matter of vigorous trees being attacked his experience coincides with what Dr. Coleman in a later letter says about the vitality of the trees attacked. This letter will we trust, bring forth from Mr. Leslie Rogers the information Dr. Coleman asks for.

All planters in Southern India will be glad to see that the War Fund has touched the half lakh : and like Oliver Twist we ask " for more."

SOUTH INDIA PLANTERS' WAR FUND.

	Rs.	A.	P.
Amount previously acknowledged	48,937	4	8
Mr. A. C. Morrell	25	0	0
Mr. W. H. Leahy	40	0	0
Mr. W. A. J. Milner	40	0	0
Messrs. Volkart Brothers	1,000	0	0
Total...	50,042	4	8

SCIENTIFIC DEPARTMENT, U. P. A. S. I.

Trees for Different Elevations.

Enquiries are often made as to what kinds of trees are likely to grow best at different elevations for purposes of shade, wind breaks, ornament etc.

Mr. C. E. C. Fischer, the Principal of the Madras Forest College, has most kindly furnished me with the following preliminary list of trees suited to different elevations and rainfall. It is not implied that all of these are suitable for planting on estates, but that these are trees likely to grow well and quickly in the locations indicated, most of them being indigenous trees.

When choosing trees for shade or wind breaks on estates several other factors besides their rapid growth must be taken into consideration. For instance their value as firewood or timber is important, and most of the trees mentioned by Mr. Fischer have some value beyond that of a living tree. Another important factor from the planters point of view is their possible relation to crop diseases. Thus the Mango which figures in this list is not always a desirable tree on account of the readiness with which it is attacked by scale insects. The Wild Cinnamon (*Cinnamomum Zeylanicum*) again produces Stump Rot in Coffee when it dies. Bearing this in mind however the list should prove a most valuable aid to planters who wish to plant trees on their estates for various purposes or about their bungalows, and our thanks are due to Mr. Fischer for giving us the information.

1. Low elevations up to 1500 feet. Rainfall under 30 inches.

   Cassia siamea (*C. florida*).—A very common tree in Bangalore with yellow flowers.

   Thespesia populnea.—The Tulip or Portia Tree. *Huvarasi*, Kan. *Pursa* or *Pursang*, Tam.

   Caesalpinia coriaria.—Divi-divi.

   Pithecolobium dulce.—*Korukapali*, Tam.

   Sapindus emarginatus.—Soap nut.

   Mangifera indica.—Mango.

2. Low Elevations with a Medium Rainfall; 30 to 50 inches.

   Melia dubia.—*Vembu*, Tam.

   Mangifera indica.—Mango.

   Strychnos nux-vomica.

   Bambusa arundinacea.—Bamboo.

   Pithecolobium saman.—Rain Tree.

   Bombax Malabaricum.—Silk Cotton.

   Eugenia jambolana.—Naga.

   Schleichera trijuga.—*Sagadi*, Kan.

   Caesalpinia coriaria.—Divi-devi.

3. Low Elevations with a heavy Rainfall, over 50 inches.

   Vateria indica.—*Bili Dupa*, Coorg.

   Myristica fragrans and other species of *Myristica* Nutmeg.

   Ficus elastica.

   Artocarpus hirsuta.—*Heb. halasu.* Kan.

   Bambusa arundinacea.—Bamboo.

   Hopea parviflora.—Ironwood.

   Lagerstroemia flos-reginae.

   Schleichera trijuga.—*Sagadi*, Kan.

4. Medium Elevations, 1500 to 4500 feet. Rainfall 30 to 80 inches.
   Tectona grandis.—Teak.
   Bombax malabaricum.—Silk Cotton
   Eugenia jambolana.—Naga.
   Melia dubia.—*Vembu*, Tam.
   Cedrela Toona.—Toon, *Naga*, Coorg.
   Schleichera trijuga.—*Sagadi*, Kan.
   Mangifera indica.—Mango.
   Artocarpus hirsuta.—*Heb halasu.* Kan.
   Bambusa arundinacea.—Bamboo.
5. Medium Elevations, 1500 to 4500 feet. Rainfall over 80 inches.
   Myristica species.—Nutmeg.
   Ficus elastica.
   Artocarpus hirsuta.—*Heb. halasu*, Kan.
   Cinnamomum Zeylanicum.—Wild Cinnamon.
6. High Elevations over 4500 feet.
   Eugenia montana.—A Nilgiri tree but a slow grower.
   Cinnamomum Wightii.—A Nilgiri Tree.
   Acacia melanoxylon.—Australian Blackwood.

In the above list where vernacular names are quoted they have been taken from Brandis' "Indian Trees" and the Deputy Director of Agriculture, Planting Districts, will be glad to receive local names of any or all the trees mentioned or further vernacular names.

Granular Nitrolim.

The Journal of the Board of Agriculture (England) for March contains a note on the subject of granular Nitrolim, a new form of this fertiliser which was put on the market in 1914 which has several advantages over the familiar finely divided material which is so difficult to handle and apply. It is said to be a great improvement on the original Nitrolim and it contains 15·5% of Nitrogen.

Nitrolim gives the best result when worked into the top soil. There is no fear of its being washed out and the free lime which it supplies, some 40%, exerts a beneficial effect on the soil when it is applied in this way.

With regard to mixing Nitrolim with other fertilisers the following points may be noted. "Nitrolim makes an excellent mixture with Basic Slag, no chemical change taking place at all; it mixes equally readily with Bone Meal, Steamed Bone Meal, and Potash Salts. *Nitrolim must not be mixed with Sulphate of Ammonia*, but it mixes well with Nitrate of Soda. Its behaviour with Superphosphate depends to a certain extent on the proportions used and the condition of the Superphosphate. In proportions of, say, one of Nitrolim to four of Superphosphate, where the latter is in good dry condition, an excellent mixture is obtained, with very little, if any, development of heat, and certainly no loss of Ammonia. In equal proportions with damp Superphosphate considerable heat may be developed and steam may be given off, but even then it is unlikely that any loss of Ammonia would occur. A certain amount of reversion may take place, but the reverted phosphate is still citric soluble and available as plant food. It is recommended, that, where convenient, the mixture should be made just before application, especially when a higher proportion of Nitrolim than one to four of Superphosphate is being employed."

Nitrate of Lime.

The Midland Agricultural and Dairy College (England) Report on Field Trials 1915 contains the following note on Nitrate of Lime.

"Nitrate of Lime has been on the market for several years, and is now more generally known. It is a greyish material containing 12¾ per cent. of nitrogen, and also about 25 per cent of lime.

"Its great drawback is that it tends to absorb moisture from the air, and to become wet and sticky, and it then has a burning effect on the skin. The present product is, however, much improved in this respect and if proper care is taken in using it no trouble need ensue.

"The following precautions should be attended to:—The barrels containing it should be stored in a dry place, and should be kept closed until the material is required. It should be sown on a dry day. If mixed with superphosphate it forms a dry and easily-sown mixture which does not become wet and sticky so quickly. Such a mixture must, however, be sown immediately after being made. This manure continues to be considerably dearer per unit than other nitrogenous manures, and this, coupled with the greater difficulty in handling it, are against its more extensive use."

Tea and Coffee Shop in the Nilgiris.

The question of the provision of counter attractions to toddy shops, which tend to promote intemperance, is a subject which has often been discussed in planting districts. In the Nilgiris a scheme has been on foot for some years, and at a Meeting of the Nilgiri Planters Association held on 27th September 1915 a special Committee was appointed to discuss with the Collector the best means for establishing tea and coffee shops.

Whether as a result of the deliberations of the Committee or not we do not know, but we understand that the Ootacamund Municipal Council have decided to take the matter up and it is proposed to open an attractive tea and coffee shop. Among the 'attractions' a gramophone is suggested. The idea appears to be an excellent one and in addition to its influence on intemperance it will provide a means of making known to a wider public the products of the district and their advantage as wholesome beverages.

Humogen.

A great deal has been heard lately of 'Humogen' or bacterised peat upon which Prof. W. B. Bottomby has done so much work, and several enquiries have been made about this subject by planters who are natually interested in new sources of fertilisers even when these are not claimed to produce such wonderful results as Humogen. A series of trials of this fertiliser have been made at Woburn and elsewhere and in the *Journal of the Agricultural Society of England* the latest results of these have been set forth. The position with regard to 'Humogen' may be summarised as follows:—"Under conditions such as those obtaining in greenhouse cultivation, and where plants can be regularly watered and tended, a good preparation of "Humogen" may produce a very marked increase in the growth of the green parts of plants and in the growing of green crops, but it will show practically no benefit in the production of grain."

"Under natural conditions of crops growing in the open, it has not as yet been established that, as regards the ordinary corn crops of the farm, any advantage is likely to accrue from the use of "humogen" when used in quantity such as a farmer is likely to be able to afford."

RUDOLPH D. ANSTEAD,

Deputy Director of Agriculture, Planting Districts.

ESTATES AND PEST SANITATION.

We are indebted to the *Statesman* for the following account of a lecture delivered by Mr. A. C. Tunstall, the Assistant Mycologist to the Indian Tea Association, before the Darjeeling Planters' Association.

As remarked by the *Madras Mail* this lecture is full of interest to South Indian Planters and the views in it are especially acceptable to our Scientific Department which has for years taught the necessity for organised and permanent "pest gangs" on estates. Many estates have established such gangs, especially in the case of Rubber, who do nothing else but go round the estate regularly and attend to any diseased trees which may be found. One of the many advantages of this system is that diseases are dealt with promptly as soon as they make an appearance and before they have time to spread. This is most important in the case of fungi which under favourable climatic conditions form spores very rapidly which are carried by wind or rain to neighbouring plants to infect them.

Mr. Tunstall carries the idea still further and advises the institution of a regular "blight brigade" for large areas, properly equipped with the necessary outfit of sprayers, and spraying material, and backed by the advice of the Scientific Department. We most heartily agree with him that this is the best and most efficient method of dealing with diseases on a large scale but it needs *co-operation* and co-operation is apparently barred by South Indian Planters for some inexplicable reason.

There are two essentials to the successful distribution of a fungus disease; 1st for the live spores to be distributed to fresh host plants; 2nd, for the host plants to be in a suitable condition for infection.

In the plains the distribution of fungus spores from one garden to another is hindered by large belts of jungle often miles in width. There seems to be little doubt that these stretches of jungle act as filters to the wind and thus prevent distribution by that the most usual method. The spread of a fungus which only attacks tea in districts where gardens are so separated almost invariably follows the roads.

Experiments recently conducted in America show that belts of trees have remarkable filtering effects on air currents. Also recent research on various insect pests show that they are also very effective barriers to the distribution of certain insect pests, for instance the shothole borer. One of the most obvious methods of isolating pieces of tea from one another is by planting wind breaks of suitable trees. In a district like this the contours of the land would possibly nullify the effect of windbreaks although I distinctly remember noticing the retarding effect of a belt of trees a few dozen yards broad on the spread of blister blight on one garden. The blight did not go over the belt but spread round it in spite of the fact that the hill side was very steep. I do not suggest that a lot of money be spent on planting wind-belts, but, only that observations should be made as to the effect of existing wind belts on the distribution of blights. It may be found that a belt of reasonable width in certain positions would check the spread of a fungus disease or insect pest for a sufficiently long time to enable steps to be taken to eradicate the blight while it was still confined to one section. Wind-breaks may be effective on one garden and yet on another by reason of some peculiarity of contour they may be quite useless. It is impossible to generalise and I merely put forward the suggestion tentatively.

That fungus spores may be carried about on the coolies' clothes has been pointed out already and it is obviously foolish to allow coolies to proceed to uninfected areas immediately after working on infected areas. On the outbreak of disease special coolies should be told off to do all the operations necessary to the infected areas. These coolies should not be allowed to work on uninfected tea until the spores they have possibly picked up have had time to die. This in the case of blister blight would be about three days By exercising a little common sense a good deal of unnecessary loss may be avoided.

In the other essential factor to the successful distribution of fungus disease—the receptive condition of the host plant, we find one of the best opportunities of dealing with blight attacks. Experiments have from time to time demonstrated that the susceptibility of plants to particular diseases may be influenced by manurial applications. From the observations made in this district however it was found that the quantities of manure required to bring about an appreciable reduction in the amount of blister blight were such as to render this method of treatment impracticable. There is still hope that in the light of later investigations this method may be made practicable.

So far I have only mentioned indirect methods of fungus blight control. Spraying is the most satisfactory direct method of blight treatment. A spray fluid not only renders the plant immune to blight by clothing it with a blight proof armour but also kills the fungus wherever it comes into contact with it. In addition some fluids have the still further advantage of stimulating the plants to which they are applied.

Mr. Tunstall proceeded to give the results of his recent observations on spraying in other districts. The two principal types of sprayers, the barrel fitted with long tubes, and the knapsack, were tested against one another, and the knapsack type was proved to be by far the best. He would not advise anyone to purchase machines of the barrel or tank type. Of the knapsack types of machine he was still of the opinion that the pneumatic are the best. Of these the battery kind were the most satisfactory. He cited various points in favour of the latter, and pointed out a few improvements still necessary.

Of spray fluid he had little to say except that he had realised that it is useless to advise the use of fluids which require any special care in their preparation. It was, he believed, in many cases, impossible for the management to give the necessary amount of supervision to the manufacture of spray fluids, and it was frequently more satisfactory, even if more expensive, to use ready made preparations of known value.

I think I am right in saying Mr. Tunstall proceeded, that the treatment of blights is now being attempted on most of the gardens in this district, and, most planters recognise its necessity, but, you realise from the foregoing remarks on the distribution of fungi that if a disease like blister is to be stamped out or even kept in control something more besides individual effort is required. The great war has taught us the wonderful results which can be brought about by skilful organisation. Blister blight alone is an enemy which is costing you many thousands of pounds every year, yet this disease has so far only been attacked in a haphazard way. Organisation and co-operation and subordination of petty personal inclinations are as essential to the successful treatment of fungus enemies as they are to the defeat of the Germans. The arrangement of such a scheme is more

a matter of business than of scientific investigation and I have hesitated to put one forward on that account. I am taking the liberty of doing so now however in the hope that you will criticise it, improve it until it seems quite satisfactory and then *carry it out.*

I think most difficulties would be overcome, if a permanent spraying brigade fully equipped with material and machinery be established. The brigade should consist of companies each of a competent mistri assisted by a number of sirdars. Whenever an outbreak of blight is reported a company with full equipment proceeds at once to the place. The mistri in charge arranges all details such as leading on water and the manufacture of solutions; the actual spraying being carried out by gangs of garden coolies each under the charge of one of the sirdars mentioned above. Whenever spraying operations are not being carried out, the brigade staff would be occupied in systematically searching for the blight; each sirdar being allotted 400 or 500 acres. I think it would probably be advisable to have a separate company to each valley under the control of the valley. In case of an epidemic in any one valley being too severe for a single company to cope with, the help of other companies might be requisitioned.

Taking the Teesta Valley as an example, Mr. Tunstall went in detail into the cost, showing that the brigade account would be as follows :-Capital expenditure Rs. 7,000; annual expenditure Rs. 2,270 ; total Rs. 9,270.

Proceeding Mr. Tunstall said: "The brigade would deal with certain specified blights. The selection of these would be arranged by your Association. Our department would instruct the members of the brigade in the best methods of controlling them. By attacking the diseases when they were most vulnerable the work would be very considerably reduced. For instance, in the case of blister blight, the disease would be searched for and treated in the cold weather, and, if every subsequent outbreak were reported and treated at once, there would never be any need for spraying large areas. The officers of the brigade would require careful training and their supervision would require care, but I feel confident that the difficulties likely to be met with would be overcome.

I feel sure you all see the grave necessity for doing something on these lines. Consider the helpless position of your district at the present time. Suppose a really serious disease broke out: a disease which killed out the bushes and spread with the rapidity of blister blight. In a few weeks the famous tea gardens of Darjeeling would have ceased to be. This is not a far-fetched notion. Such a catastrophe happened not so many years ago in the coffee districts. Gentlemen, the position is unsound. The tea in the district is as open to destruction, without a co-operative scheme of blight treatment, as our Empire would be without the navy. For a small initial expenditure and a negligible revenue attack of blight or pest may at any rate be held in check. The success of such a scheme requires the active co-operation of every garden in the district. There are so many different interests involved that the voluntary co-operation of the whole district cannot be expected, and, I suggest that if the majority of the planters in the district agree to it, the local Government be asked to make it compulsory. Many of you have had experience of other parts of the world and you know that in the Colonies and in America the Governments concerned make stringent laws for the control of pests and blights. I do not foresee any grave objections to the adoption of such a course by our own Government in the case of the tea industry.

CORRESPONDENCE.

Deepdene Estate,
Kyambu, B. E. A.,
23rd August, 1916.

THE EDITOR,
Planters' Chronicle,
Bangalore.

Spraying for Leaf Disease.

Dear Sir,—As the question of the causes of, and remedies for, leaf-disease is being so largely discussed in your columns just now, the following remarks may be of interest to Indian Planters.

Conditions here are very different from those obtaining in S. India and therefore it does not follow that remedies that succeed here will succeed with you.

I had better give a brief idea of the conditions here. The land is gently undulating, nowhere anything approaching steep. The soil is of unlimited depth, extremely porous and totally devoid of stones and stumps. It is regularly cultivated, kept absolutely free of weeds and mulch is non-existent. The trees are well and thoroughly pruned and handled. The rainfall is ridiculously low. I doubt if it averages 40 inches and it often totals under 30. We get the "long" rains from about the middle of March till the end of May, and the "short" rains from about the last week of October till the end of November. During the intervening dry spells we get fortuitous showers when we are lucky. There is a long period of cold dull misty weather from early July for some 6 weeks. The Coffee is planted from 8' x 8' to 9' x 9.' At 2½ or 3 years of age it bears its first crop of from 5 Cwt. to 10 Cwt. per acre. Blossom appears at almost any time of the year and as we get 8 or 10 distinct blossoms large or small, the consequence is that crop goes on, with little intermission from May to early January. We have no shade whatever nor do I see any call for it at present.

The conditions being apparently so favourable, why do we get with unfailing regularity two distinct goes of leaf-disease annually, each appearing after the rains are over? I take no stock in any theory of leaf-disease being favoured by an exhausted condition of the trees, for the simple reason that it attacks our fittest trees and extends to young trees which have not reached the bearing stage and are in the very pink of condition. In fact if the question were put to me I should say that the healthier the tree the more certain it is to get leaf-disease. On my own place there are a few trees which are always looking seedy (either from bad planting, attacks of cut worm in their infancy or from any old cause) which escape disease, while a robust specimen next door is yellow with it.

It is quite evident that the existence of a mulch is not a prime factor in causing leaf-disease, though I can quite believe that it may harbour spores and assist in spreading it.

The disease always starts with us in the lower branches which sweep the ground, and gradually spreads to the middle and upper branches. Whether this is due to the spores spreading from the earth or to the moisture and shelter under the lower branches, I do not pretend to know.

With regard to remedies, it is beyond all shadow of doubt that Bordeaux Mixture, or the bluestone—carbide mixture used here, is perfectly efficient in overcoming the disease and preventing for a time further attacks in this country. I have good reasons for saying so, because when I first came here, 2½ years ago, a small patch of trees about 7 years old, which had been badly neglected and brutally pruned, was rotten with disease (I was advised by some to dig it up and replant!). I sprayed it in July 1914: disease re-appeared in force in January 1915 and it was sprayed again: disease came once more but nothing like so badly in June 1915 and I sprayed again in July. Since then it has been entirely free of disease until a short time ago when a very few spots were visible on odd trees. I have no doubt that when I have sprayed it (in a few days time) it will keep free of disease for a year. The same story can be told of a 10 acre field which picked up the disease at the same time when it was 3 years old.

Personally I am con vinced that the whole atmosphere of B. E. A. is full of drifting spores and that the only prevention is spraying.

Yours faithfully,

(Sd.) H. LESLIE ANDREWES.

Office of the Director of Agriculture
in Mysore,
Bangalore, dated 20th September, 1916.

Dear Sir, - I have read with interest not unmixed with surprise the letter on Cultivation and Spraying of Coffee in your journal of the 16th September. My surprise is due to the statement made in the last paragraph of the letter in which your correspondent states categorically that Leaf Disease of Coffee caused by *Hemileia vastatrix* is an indigenous disease whose origin has been traced to many wild plants in this part of the country.

It is quite true as your correspondent says that other species of *Hemileia* (*cauthii* and *woodii*) very closely resembling the fungus causing leaf disease are known and the suggestion has no doubt been made that one or the other of these fungi may be the parent of Hemileia vastatrix. As far as I am aware, however, the identity of these fungi has never been proved and I for one should be extremely obliged if your correspondent would inform us on what data his statement is based. I have long since intended taking up work on this important question of the possible occurrence of *Hemileia vastatrix* on wild plants in Southern India but pressure of other work has up to the present prevented me from doing so. I hope to be able to take up the question in the near future and any help which your correspondent or any other planter can give me will be most gratefully received.

There are a number of other statements in your correspondent's letter which seem open to criticism. I, for one, cannot agree that the cause of coffee diseases is the marked and steady decline in the vitality of coffee. The cause is, in the case of all coffee diseases, which have been thoroughly investigated up to the present, some specific fungus. Loss of vitality may be and no doubt frequently is, a predisposing factor in many cases but it is not the cause anymore than a debilitated condition of the human

body is the cause of plague, or cholera or enteric. It is also a mistake to suppose that fungus diseases of cultivated plants in general are most severe where the plants, through lack of proper cultivation, are declining in vitality. In the case of Koleroga of the Areca Palm. a plant disease which has probably been as thoroughly investigated as any other in India, we find the disease is least prevalent in so called abandoned gardens, which have been out of cultivation for years and where the trees are so lacking in vitality as to produce practically no crop at all. On the other hand in highly cultivated and well manured gardens in the same neighbourhood the disease is usually very virulent. This is but one of many instances which could be cited where plant diseases have been clearly shown not to depend for their virulence upon lack of proper cultivation.

Yours faithfully,

LESLIE C. COLEMAN.

The Mercantile Bank of India, Ltd.,
Post Box No. 11,
Madras, 15th September, 1916.

The Planters' Chronicle,
Bangalore.

Dear Sir,—For favour of publication in your next issue I have the pleasure to inform you that the Directors of the Mercantile Bank of India, Ltd., have declared an interim Dividend on the "A" and "B" Shares for the half year ending 30th June last at the rate of less tax.

Yours faithfully,

L. KEAY,
Manager.

National Bank of India, Ltd.,
Post Box No. 64,
Madras, 15th September, 1916.

THE MANAGER,
Planters' Chronicle,
Bangalore.

Dear Sir,—We should be much obliged if you would kindly insert the following item of information in an early issue of your journal.

The National Bank of India, Ltd., Madras, have received a cable from their London Office intimating that the net profits for the half year ending 30th June, including £103,140 brought forward amount to £244,466. The Directors have declared an interim dividend of 16 per cent per annum equal to £1 per share, and propose to carry forward £164,466.

Yours faithfully,

.....

Manager.

MARKETS, PRICES AND STATISTICS.

Coffee.

The following are the receipts from Brazil up to 28th August:—

1916.	1915.	1914.	1913.
2,738,000	3,263,000	1,588,000	2,702,000

Offerings in auction have been as follows:—

——	15—25 August.	Since 1st Jan.	Last year.
East India	191	27,102	40,373
Costa Rica	1,972	91,307	91,619
Other Milds	2,475	60,649	131,075
Brazil	2,229	69,014	100,084
Robusta	Nil.	1,315	13,055
B. E. A. & Uganda	214	7,583	10,220

Market very quiet, but prices fairly steady, Of the supplies in auction Costa Ricas mostly sold at previous prices, but other kinds met little demand.

The Mysore Chamber of Commerce Weekly Market Report dated 18th September quotes the following prices for Coffee per maund of 26½ lbs. Peaberry Rs. 15 to 16, Parchment Rs. 12. Native Rs. 10-4. Chickmaglur quotes, Peaberry Rs. 15. Native No. 1, Rs. 11-4. and Native No. 2, Rs. 10.

The following quantities of Coffee were exported from the State of Mysore during the quarter ending 31st March, in Railway maunds.;

1916	1915	1914
13,104	20,361	45,243

Tea.

There has been good competition, especially for the better qualities, and prices are again tending in favour of sellers. The commonest kinds have also been more enquired for and are fully steady.

The following quantities of Tea were shipped from Madras Presidency during August:—

	lbs.
To United Kingdom	1,617,660
To Ceylon	341,150
To Canada	759,961
To New Zealand	300
Total ...	2,719,071

The following prices were obtained for South Indian Teas at the London sales on 28th and 30th August :—

—	B.O.P.	B. P.	Pek.	O. P.	P. S.	P. F.	Fgs.	Dust.
TRAVANCORE.								
Munaar ...	11	10¾	...	...	...	...	...	...
Sevenmallay ...	...	10½	10	...	...	...	...	...
Koney ...	...	9½	...	...	...	...	...	...
Poonmudi ...	10	9¾	9½	...	...	...	...	...
Perriavurria ...	10¾	10¾	10	...	...	11	...	...
Yellapatty ...	...	...	...	10	...	...	...	...
Surianalle ...	11½	10¾	10¼	10¾	...	...	...	9¼
Gundamullay ...	11	10¾	...	10¼	...	...	10¾	...
Nullatanni ...	10¼	10¼	...	9¾	8¾	...	...	...
Ambanaad ...	9½	...	9¼	...	9	...	...	8
Venture ...	10¼	...	9½	...	...	9	...	7¾*

* Withdrawn from sale.

Rubber.

After a better market and firmer prices, up to 2/4 for first crepe and 2/3½ for smoked sheet, things are easier again and prices about ½*d.* lower.

Messrs. Lewis and Peat give the following prices :—

	September.		Oct.—Dec.		Jan.—March.		Jan.—June.	
	Sellers.	Buyers.	Sellers.	Buyers.	Sellers.	Buyers.	Sellers.	Buyers.
First Crepe ...	2/4	2/3¾	2/4½	2/4¼	2/5	2/4½	2/3¾	2/3¼
Smoked Sheet ...	2/3¾	2/3¼	2/4¼	2/4	2/4½	2/4	2/4½	2/4

Spices.

PEPPER.—A small business on the basis of about 9*d* for fair Tellicherry. *The Mysore Chamber of Commerce Weekly Market Report* quotes the following :—Prices range from Rs.12-8 to Rs.13 per 25 lbs. Saklespur quotes Rs.12 per maund.

CARDAMOMS.—The same authority quotes Rs.25 to 32 per 25 lbs. Saklespur 4s. 20 to Rs.25 per maund.

Statistics.

We are indebted to the Director of Agriculture for the following information about the import and export of manures in the Madras Presidency taker. from a statement supplied by the Director of Statistics.

The following quantities of Fertilisers were imported into the Madras Presidency :—

	1911—12 Tons.	1912—13 Tons.	1913—14 Tons.
Sulphate of Ammonia ...	94	184	188
Nitrate of Soda ...	47	10	35
Nitrate of Potash ...	123	139	175
Nitrolim ...	161	212	123
Superphosphate ...	213	315	460
Basic Slag ...	1,150	1,120	1,869
Precipitated Bone Phosphate. ...	...	...	89
Nitrate of Lime ...	39	246	583
Sulphate of Potash ...	769	1,371	1,638
Kainit ...	12	74	30

R. D. A.

The Planters' Chronicle.

RECOGNISED AS THE OFFICIAL ORGAN OF THE U. P. A. S. I., INCORPORATED.

(Secretary's Registered Telegraphic Address "Planting," Bangalore.)

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THE U. P. A. S. I.

(INCORPORATED.)

Contents.

We publish the proceedings of the Nilgiri Planters' Association, which was well attended and many interesting subjects were discussed.

We extract from the *Spice Mill* of August a somewhat lengthy article on Coffee which will be of interest to all Coffee Planters and holds out hopes. We were impressed with the remarks. probably not original, that "War does not consume, it wastes" and "without the war which has materially restricted speculation, the intrinsic situation would justify much higher prices."

Incidentally our correspondence columns this week are entirely taken up with coffee planting subjects. Basket Planting is written on by L. P. K. and Mr. Mathias in answer to Mr. C. J. Hayward, whose letter, published in the issue of the 16th, receives attention at the hands of Mr. Randolph Morris and Mr. Leslie Rogers, though the latter's letter goes into the broader question of Open versus Closed Pit Planting.

The Secretary, U. P. A. S. I. sometimes receives applications for Billets' He has such a one on hand at present, and would be pleased to forward copy of application to any Proprietor in want of an Assistant.

We regret by an oversight in our last week's issue, we omitted to mention the rate of Dividend declared by the Mercantile Bank of India, Limited, which should read: "The Directors of the Mercantile Bank of India, Limited have declared an interim Dividend on the 'A' & 'B' shares for the half year ending 30th June last at the rate of 5% less tax."

SOUTH INDIA PLANTERS' WAR FUND.

	Rs.	A.	P.
Amount previously acknowledged	50,042	4	8
Mr. A. Yates	40	0	0
Kuttikal Estate	250	0	0
Mr. J. S. Nicolls	80	0	0
Messrs. Morgan Brothers (H. R., James T. & C. H. Morgan)	1,000	0	0
Mr. H. L. Pinches	40	0	0
Total...	51,452	4	8

DISTRICT PLANTERS' ASSOCIATIONS.

Nilgiri Planters' Association

At a meeting of the Nilgiri Planters' Association held at the Collector's Office on Monday, 11th September, the following members were present.—Mr. A. S. Dandison, Vice-Chairman in the chair; Mr. Gerrard Rogers, Honorary Secretary; the Hon'ble Mr. E. F. Barber, Mr. J. Harding Pascoe, Mr. James Stanes, Mr. P. Beaver, Mr. J. Bisset, Mr. J. B. Leslie Rogers, Mr. R. N. C. Grove, Mr. J. Vernede, Mr. E. Sydenham Clarke, Mr. George Oakes, Mr. A. K. W. Downing, Mr. Elkington, Mr. C. L. Egan.

HONORARY MEMBERS.—Mr. A. R. Knapp, I.C.S., Mr. I. Jones, Superintendent of Police.

VISITORS.—Mr. E. F. H. Gerrard, Mr. Richardson and Mr. D. H. McLeod.

THE LATE MR. THOMAS BROWN.—Before the business on the agenda was taken up the Vice-Chairman paid a fitting tribute to the late Mr. Thomas Brown and a resolution to the effect that the Honorary Secretary write to Mrs. Brown expressing the sympathy of the Association, was carried unanimously, all members standing.

PRESIDENT.—The Vice-Chairman then read a wire from the Chairman of the Association, Mr. J. S. Nicolls, to the effect that his car had broken down and that he was unable to get in in time to preside at the meeting.

No. 187. PROCEEDINGS OF LAST MEETING.—The proceedings of the last meeting were taken as read and confirmed.

No. 188. CORRESPONDENCE (1) FOREST RESERVES.—The following extract from a letter from the District Forest Officer was read.

"I am anxious to simplify the boundaries of the reserves which in many cases are very tortuous and shall be glad to consider any suggestions that may be put forward in cases where the crooked boundary is a source of inconvenience to adjacent landholders, but it will save trouble to all parties if you will be so good as to make it clear to the members of your Association that I cannot entertain, or favourably report on applications for blocks of land simply because there is a demand for land.

The principles which will guide me in dealing with the matter are:

(1). Whether it is advantageous to straighten crooked boundaries between reserved forests and other holdings.

(2). Whether such abandonment of reserves will entail the abandonment of areas conserving water, in which case the abandonment cannot be recommended.

There is at present a special party working round the district demarcating reserved forests in an effective and permanent manner and as each reserved forest is taken up the question of how the boundary can be simplified is considered. It is of advantage however that this should be decided in advance of the demarcation and I shall welcome any suggestions. In some cases I believe it will be possible to abandon entire reserves but with the country being cut over as it is in so many places, it will be necessary to proceed with caution."

(2) EXPERIMENTAL PLOT.—The following report by Mr. Gerrard Rogers on the experimental plot was read and recorded :—

"Gentlemen,—Mr. Dandison and I visited the Experimental Plot on 3rd July, 1916. There was a marked improvement in the way the place has been cared for. Each plant has been neatly terraced round. The whole place was clean and some of the big jungle trees have been cut down thus allowing more light and air to penetrate the darkness which was remarked upon by Mr. Dandison last year, but I regret to say that green bug has not been checked and is very bad on many of the trees.

"Of the Hybrids the finest growth is undoubtedly that of B. H. No. 1, planted April 1912, good spread, height 4½ feet with 9 pairs of primaries, all bearing crop, but it had a virulent attack of bug which will very soon relieve the tree of its crop.

"B. H. No. 2 was represented by one small plant.

"ROBUSTA.—There was one good tree with ten pairs of primaries but no crop, neither was it labelled, so we cannot say when it was planted. Jamaica Arabica :—Planted 13th November 1912. One plant well away from any jungle shade made fine growth, having 11 pairs of primaries, height 4½ feet, with crop on all the primaries, but on this bush also bug was very bad. The remaining plants of this variety are nearer the jungle shade trees and have made poor growth. These same jungle trees have enormous roots spreading in all directions. We noticed a new lot of plants called Kelgannie Arabica, but no date to indicate when they were planted. Some name boards have been removed and it is obvious that in other instances the labels have been affixed to the wrong varieties. I would suggest that a small metal label be attached to each plant so that the various varieties may be more easily identified.

"Since visiting the plot, I have seen Mr. Butcher and told him about the bug and the difficulty of identifying plants through name boards being missing and misplaced.

"He informed me that spraying had been done regularly, but evidently the solution used was inefficient, so I advised the use of rosin and soda or fish oil mixture.

"As regards the name boards, he has a plan in Ooty so that the plants can be remarked correctly.

"A small extension for further planting has been made, but I understand the Forest Deparment objects to the cutting down of trees; it will be a pity if future plantings are handicapped as the first lots were and I suggest that it be pointed out to the Forest Department that unless trees that are unsuitable shade are allowed to be cut, the value of the plot will be seriously reduced, thus severely handicapping our Scientific Department."

(3) Read and recorded letter from Mrs. E. H. F. Day.

(4) Read and recorded letter from General Traffic Manager S. I. Ry, Re. fires on Nilgiri Railway.

No. 189. U. P. A. S. I. MEETING.—The following delegates' report was read :—

"Gentlemen.—We attended the U. P. A. S. I. Meeting held on the 14th of August and following days as your delegates.

An innovation was made in the proceedings by forming committees to discuss each subject before bringing forward resolutions in open Meeting. Though this in certain cases entailed repetition, on the whole it was quite satisfactory, and enabled the work in open meeting to be got through very expeditiously.

You have no doubt read the proceedings as far as have been published in the papers, but as each subject was previously considered and discussed in Committee, we ask you to read the Book of Proceedings, which will give you all discussions that took place.

The Secretary in his Report referred to those of our community who have given their lives for their country in this wicked war and the Roll of Honour was read, all standing. The Chairman reviewed the past year's work and the present situation in his opening address, a speech that will be long remembered by all present.

The Hon'ble Mr. E. F. Barber spoke on his work as Planting Member, and Mr. Anstead and Mr. Martin reviewed the position and work of their respective Departments.

The Rev. Mr. Breeden made a most eloquent appeal for the support of the St. George's Homes at Kodaikanal. No doubt you have read his speech in the papers. If not, we urge you to read it in the Book of Proceedings and we trust that every one here will not only subscribe themselves but will also try to get others to help also, either by a donation or a monthly subscription.

The lectures given by Dr. Coleman and Mr. McRae were listened to with the greatest of interest and when published in the *Chronicle* should be read by all who were not fortunate enough to hear the actual speakers.

SCIENTIFIC DEPARTMENT.—Mr. Stuart, Director of Agriculture, Madras, gave a brief account of the new scheme of Experimental Stations that Mr. Chadwick sent up last year and said he hoped to receive orders to put the work in hand shortly.

He also referred to the analytical branch of the department and delegates were asked to impress on members of their respective associations the necessity of supporting this.

RUBBER GROWERS' ASSOCIATION.—It was agreed that it was the duty of every Rubber Estate in South India to support the Rubber Growers' Association by joining, as it represented their only chance of obtaining research work in this direction. We have not much rubber on the Nilgiris, but the attention of any concerned is drawn to the above, and we ask them to give it their support.

RAILWAYS.—Mr. Richards, Engineer-in-Chief, Mysore and West Coast Railway Survey, read a note on this subject and gave a list of various projects. The question largely depended on the money available, and he wished to know which scheme was supported by the U. P. A. S. I.

Opinions were expressed chiefly in connection with the advisability of a line which gave connection with an open port on the West Coast. Eventually Mr. Lake's proposal regarding the Arsikere-Mangalore proposed route was carried.

LABOUR DEPARTMENT.—It was decided by the Executive Committee of the Department that a representative of each district should be asked to attend the Meeting to voice the views and opinions of his own district and we think it is a wise step as it removes a cause for discontent and will keep subscribers more in touch with the doing of the department.

LEGISLATION.—We moved the following resolution, "That this meeting suggests an extension of a modified form of "Dharkast Rules to apply in addition to Waste Land Rules to all Planting Districts, or that the Supplemental Rules be so extended as to allow of a larger area being taken up under them."

The matter was previously discussed in Committee and we considered that the above would meet our desires in this direction. We emphasised the point that we did not object to genuine competition but did strongly object to being run up by any one as a speculation or for the fun of making a planter pay through the nose.

EXPORT DUTY ON TEA.—We voted for Mr. Abbott's resolution on this, and also for Mr. Jackson's resolution viewing with apprehension the possibility of an increased duty on coffee imported into the United Kingdom.

ALIEN ENEMIES.—Mr. Nicolls in a forcible speech supported the views of the *Madras Mail* and the Madras and Bengal Chambers of Commerce on this subject and I am sure that his words "Germans must be ostracised both morally and financially" will express the opinions of us all; it is our duty to combat the admission of alien enemies into India and the meeting was unanimous with Mr. Nicolls that every Britain in India should join the British Empire Union, the object of which is to preserve National ideals.

FINANCE.—It was decided to close the Kalisyndicate Manurial Fund and transfer the balance to the general account for the use of the scientific department; also the experimental plot fund was to be closed in the same manner. Thus the next balance sheet will be freed from the inclusion of a German name and if it is not out of place to say so here we hope that at the end of the war these potash mines may be an asset to the Allies and not a source of revenue to our enemy and that we will be able to get our potash at a fair price.

"PLANTERS' CHRONICLE."—Several suggestions were made regarding the improvement of this, and a resolution was passed thanking Mr. C. Wood for his kindness in preparing a cover design. Alternative designs are invited and if any of you are budding "R. A's." you have the chance of your lives.

A current list of agricultural bulletins is in future to be published.

The suggestion of stopping Market Prices did not meet with favour and we therefore withdrew it in Committee. It was started so as to have an easy reference to past prices as most planters do not keep a file of old market reports.

It is some years since a Nilgiri planter was elected Chairman of the U. P. A. S. I. and it is an honour to our Association that our Chairman has been elected Chairman, U. P. A. S. I.

Gentlemen, this closes our report and we thank you for the honour done us in choosing us as your delegates. If we can give any further information we shall be pleased to do so."

WASTE LAND RULES.—Some discussion took place in this connection, the speakers being the Hon'ble Mr. E. F. Barber, Mr. Richardson of Travancore, Mr. Sydenham Clarke and others.

The Hon'ble Mr. Barber summed up the situation and said that what was wanted was that there should be no auction. There should be a fixed price for land and one by which Government would not lose.

Mr. Richardson spoke as follows :—

" It has given me great pleasure to attend your meeting this morning and I have to thank your Chairman for allowing me an opportunity of saying a word or two on a subject which is also of interest to us in Travancore and that is the owner's priority of right to land on the boundary of his estate.

This right was granted to us some years ago in Travancore but until lately the only instances that have occurred have been in connection with small areas which owners have wished to take up to keep out squatters or to prevent undesirable bazaarmen from opening shops on the boundaries of their estates.

Just lately however the question has been raised in connection with larger areas and instead of our applications being accepted and the land granted at the upset price lately settled by the Darbar, we are informed that the lands in question will be put up to auction although in at least two cases the applications were placed with the Travancore Government 18 months to two years ago.

Where there is competition for land one must expect to pay more for it, but I think original proprietors should have a right to a certain percentage of lands adjoining their estates at the upset price, say 25 per cent. of their present holding and any balance over and above this might be put up to auction and sold to the highest bidder.

I should like to go still further in the matter and suggest that as the planting industry is now of such importance that the conditions regarding purchase of land, &c.; be put on the same basis throughout the whole of South India, whether in British territory or Native States.

The industry has already brought an immense amount of capital to the country which in spite of what was written in a scathing article against planters in the " Malayala Manorama" must carry with it prosperity to all classes in Southern India."

Mr. Knapp thought that a minimum limit might be fixed for new estates, so that new comers could not take up a number of small pieces. It was thought for new openers at least 200 acres should be the minimum and no application for smaller areas be considered.

Mr. Barber explained that what was wanted was the even treatment of all planters in Southern India, including Native States, with a fair price for land and a fixed assessment. After some discussion the following resolution was adopted :—

Proposed by Mr. A. K. W. Downing and seconded by Mr. George Oakes : " that as this Association is of one mind that the existing land rules should be amended by the adoption of the Dharkast rules that Messrs. Barber and Richardson take up the matter in detail and lay it before Government."

A vote of thanks to the Delegates was proposed by Mr. L. A. Gerrard Rogers and seconded by Mr. Downing.

No. 190. POLICING OF COFFEE.—Read letter from the Superintendent of Police to the effect that police arrangements for prevention of coffee thefts would be made from the 18th October, as soon as Government left the Hills, and a resolution was passed to the effect that the policing arrangements be made as early in October as possible, but not later than the 18th.

No. 191. ROADS AND COMMUNICATIONS.—Read letter from the Honorary Secretary West Coast Planters' Association and Mr. K. West complaining of the state of the Nadgani Ghaut Road within the Nilgiri limits.

Mr. Barber was also of opinion that generally speaking the roads had gone back from their previous condition. He laid particular stress on the condition of the Gudalur Ouchterlony Valley road.

Mr. Knapp stated that he had found that no general repairs had been carried out for the last three years. He meant to start a regular system of repairs, but it was a question of money with the present rise of price in materials.

Mr. Harding Pascoe also spoke to the bad condition of certain roads and Mr. Beaver drew attention to the condition of the Kartary-Devarashola Road. After several speakers had given their views on the condition of the various roads the following resolution was carried unanimously.

Proposed by Mr. L. A. Gerrard Rogers and seconded by Mr. A. K. W. Downing: "that the attention of the President of the District Board be called to the deterioration of some of the district roads and that the District Board be asked to approach Government with a view to obtaining a large grant for the repair of these roads."

KARTARY ROAD STATION.—Several members complained of the unsatisfactory work of the Kartary Road Station staff and the inadequacy of the goods-shed. The following resolution was carried:—

Proposed by Mr. A. K. W. Downing and seconded by Mr. J. Harding Pascoe.

"That the Honorary Secretary be asked to write and point out to the G. T. M., S. I. Railway, the inadequate accommodation for goods at the Kartary Road Station, and that he be asked to, at an early date, have the present goods-shed at least doubled in size. This station is now taking a large quantity of goods traffic and the station staff is utterly incompetent and insufficient to deal with the work."

CATTLE POUNDS AT KOTAGIRI.—A letter from Mr. Clarke was read on the subject and several members gave their experiences as to the damage done by stray cattle. It was pointed out that claims for damages to the extent of about Rs. 20 might be made before a Village Munsiff and that such claims, if awarded, might act as a greater deterrent than enhanced pound fees. Mr. Clarke pressed for deterrent pound fees. He pointed out that 15 years ago the Collector had doubled the pound fees in Kotagiri and it was doubtful if the Collector could now further raise the fees. The following resolution was carried:—

Proposed by Mr. Sydenham Clarke and seconded by the Hon'ble Mr. E. F. Barber.

"That this Association recommends the enhancement of the pound fees in the Nilgiri district."—Carried unanimously.

VOTES OF THANKS.—With a vote of thanks to the Collector and to the Chairman the meeting terminated.

(Signed) A. S. DANDISON,
Vice-Chairman.
(„) L. A. GERRARD ROGERS,
Honorary Secretary.

COFFEE.

The following article is extracted from *The Spice Mill* of August.

Statistics up to June 30, 1916, recently published, have been summarized by the *Bulletin de Correspondence* in the following table:—

	1915-1916.	1914-1915.	1913-1914.
	Bags.	Bags.	Bags.
Supply July 1 ...	7,524,000	11,317,000	10,288,000
Brazilian Production ...	15,960,000	13,471,000	14,457,000
Production of Various Coffees ...	4,801,000	4,394,000	5,154,000
Total...	28,285,000	29,182,000	29,899,000
Actual Movement ...	21,200,000	21,658,000	18,582,000
Supply June 30 ...	7,085,000	7,524,000	11,317,000

It appears to us interesting to submit to you the general considerations which this situation sugggests to us.

It appears, first, that in spite of a total production in 1915-1916 of 20,761,000 bags (exceeding that of preceding years, respectively, by 2, 896.000 bags, 1,150.000 bags, 4,355,000 bags and 3,387,000 bags), the visible supply has declined to 7.085.000 bags, compared with 7,524,000 bags in 1915. 11,317,000 bags in 1914. 10,288,000 bags in 1913, 11,105,000 bags in 1912. There is lacking, to cause this result, a corresponding increase in the world's consumption.

The two years of war have, as a fact, been characterised by the immensity of the actual movements—21,658,000 bags in 1914-1915, 21.200,000 bags in 1915-1916—figures exceeding by 3 to 4 millions of bags those of normal previous years.

For the last year the first appearance of the figures showing such a considerable movement, have aroused doubts as to their genuineness; extraordinary stocks and reserves were credited to the Scandinavian countries, to Italy and Germany, not willing to admit that the quantities exported to these countries, in excess of the statistics, had been actually able to enter into consumption.

It may certainly be admitted that the northern countries have in transit certain merchandise for which Germany is anxiously waiting, but, as it is, a scarcity rather than a plenitude that prevails in the latter country, and as the difficulties of supply are enormous it must be concluded that the quantities sent northward, as contraband or otherwise, are consumed, or are on the way to consumption and that the statistics relating to the admitted movement are perfectly truthful and accurate.

Another conclusion to be drawn from the statistics, in spite of the war that is ravaging and laying waste all Europe and in spite of the blockade, is that the rather considerable harvests have found their entire disposition.

We say, "in spite of the war," but it would be almost more correct to say, "by reason of the war"; war does not consume, it wastes. Judging by what has happened in France, one can easily explain the increase of several million bags in the world's movement.

Thus the customs clearances in France, in 1915, have been 2,305,000 bags, compared with an average of 1,800,000 bags for the years previous to the war, and this, in spite of the overrunning of a considerable extent of territory.

The war and navy departments buy about 100,000 bags per month, which represents an annual and additional consumption of 1,200,000 bags, without taking account of what is furnished to the armies through direct trade at the front.

The Belgium and British armies also consume coffee—in the rear there is considerable activity and the indulgence that follows the expenditures of war in salaries, etc.—while the intensified life in certain sections also helps to increase the consumption.

It is, therefore, undeniable that if the blockade has been able to restrict consumption in the central empires and elsewhere, the world's consumption has no less undergone a considerable increase.

The only serious argument advanced by professional pessimists, derived from enforced abstinence, from the fact of the blockade, from the Germanic purchases, formerly very important to Brazil, cannot be maintained in the face of facts.

The blockade, no matter how strictly it may be enforced, is never hermetical. There will always be some leakage, in spite of the Dutch N.O.T. and the Swiss S.S.S., which in theory are perfectly efficacious, but in practice cannot prevent all contraband.

We acknowledge, moreover, that the blockade is an important factor in the problem under consideration, but allowing our premises (consumption exceeding production for the past two years) we must conclude that if the blockade did not exist there would not be enough coffee in sight to suffice for the requirements of the season of 1916-1917.

The blockade will have the effect of impeding the distribution of the crop, Brazilian or other, but it will also have the effect of creating an enormous deficiency, which must be, some day or other, suddenly filled.

It is not only the central empires that are being deprived of supplies; Turkey, the Balkans and the neutral nations of the north, more or less on short allowance, are totally or partially stripped; it would require several million bags to satisfy their requirements at a given moment.

From these facts we can easily imagine the rush of buying that would take place in case fortunate or unforeseen events should put an end to hostilities.

In a lesser degree the bare possibility of peace would already have a serious effect on the demand and consequently on the market prices of the article.

It is, however, not likely that this rush will take place suddenly.

The complete exhaustion of the supplies of coffee in the central empires, visible as well as invisible, eliminates, at the present time, the question of their re-establishment after a more or less brief delay.

Recently the rumour has been in circulation that a syndicate was in course of formation in New York which would be entrusted with the making of purchases of coffee on German account, with a view to prevent them being

caught unprovided in case of the cessation of hostilities; even the name was given, a person well known in Havre, at present at leisure owing to the unfortunate condition of things prevailing and who would be the promoter of the syndicate.

Almost simultaneously, we learned, through a neutral friend returning from Hamburg, that the same subject was a matter of daily agitation in commercial circles there and that the idea had been considered and discussed, of accumulating stocks, either in Brazil or in the United States. The formation of a syndicate in New York could evidently be connected with the same plan. We reproduce below an extract from an English newspaper confirming the ideas that are at present haunting the Germans.

"Frank admission of the German's proposed, after the war, dumping orgy was made last Saturday in Berlin at a meeting of eminent business men, called to found a "League for Import Trade." Similar associations are springing up in all important commercial centres, Hamburg and Bremen having initiated the movement. Speaking of Germany's arrangements on raw materials at the end of the war, Privy Councillor Kopetzky, vice-president of the Berlin Chamber of Commerce, stated that "*large purchases of raw-stuffs for German account have already been made and are now warehoused, awaiting shipment.*" He added that Germany's first imports, after signature of peace, would be "indispensable food supplies," then "raw materials, in the order of their importance."

The same spirit of foresight which led them to accumulate stocks of raw wool at La Plata, last year, in advance of a peace which at that period they regarded as imminent, will inspire them, without a doubt, to take similar steps in regard to coffee; however, it is not in Europe nor in the United States (where supplies are reduced to the lowest minimum and must themselves be replenished) that the central empires will seek to supply the deficiency created by the war and the blockade; it is to Brazil to which they will have recourse.

These purchases, which we will call "preventive," will certainly be effected in the course of the season 1916-1917 and the fear of seeing Brazil lacking buyers for part of her crop, going as formerly to Hamburg and Trieste appears to us to be devoid of foundation.

But even should a temporary accumulation of unsold stocks take place in Brazil, the Government of Sao Paulo, certain moreover of their movement after the lapse of more or less time, having deficiencies to make up, would seize on the opportunity; it would be an easy matter to do in a small way what the United States have done on a large scale for the protection of the crop of 1914-1915 thus threatened; it will be easier to valorise several million bags of coffee than it is to consolidate a crop like cotton, representing a value, according to quotations, of 4 to 5 milliards of francs.

We may here recall that the Brazilian crop, according to the most reliable authorities at present, will be: 10,000,000 bags Santos, 2,500,000 bags Rio, 750,000 bags Bahia, Victoria, etc., altogether 13,259,000 bags; while in 1915-1916 the movements of Brazilian coffee have been: 7,439,000 bags to Europe, 8,849,000 bags to the United States, total 16,288,000 bags.

The United States, the population of which increases every year and where prosperity prevails in the highest degree, consumed in 1915-1916 two million bags more than in 1912-1913 and 1911-1912, making up, in part, for the reduced takings of Europe, due to the abstinence of the Germanic countries.

The same movements, and there is nothing to indicate that they may be less, will absorb, therefore, not only the Brazilian crop, but compel the addition, from the visible supply, already limited, of 3 millions of bags.

To these almost certain movements must be added the "preventive" purchases on German account.

Brazil, therefore, has nothing to fear, in our opinion, from the blockade; the outlet for its crop is assured, whatever may be the competition that the revictuallers of the Germanic countries may offer; the probabilities remain, therefore, rather in favour of an insufficient production than an over-abundance of coffee.

In a recent American circular we find this statement:—"The new crop is already coming into the port of Santos and, in view of the difficulties of shipping to Europe, except to France, the United States will be the principal buyer and will be able to dictate prices.

As long as a national article is not concerned, the north Americans always want to dictate the price, in other words buy cheaply. In our opinion, they may just as well submit to the price as dictate it,

As a fact, they are confronted with quite a precarious situation. The stock in the United States, in all, is about 1,960,000 bags, plus a floating stock of 90,000 bags.

Now there is included in this stock about:—550,000 bags of soft coffee, of which there are sold 200,000 bags per month; 500,000 bags of Rio coffee (high grade "filieres"), of which the market hardly ever takes any; it is a dead weight that has been carried for years; 200,000 bags of low Rio and Victoria, three months' consumption, finally 700,000 bags of Santos, of which the United States consumed about 400,000 to 500,000 bags per month.

Here is a situation which hardly allows of waiting for events to dictate prices, and the United States should soon feel constrained to take up buying seriously in Brazil.

It is true that tonnage is scarce in Brazil, but this would be easily remedied by the arrival of steamers at present on the way.

Nevertheless, freights will remain high, and, in accordance with advices we have received, they will experience a further advance, beginning with the first of October.

Summing up the foregoing conditions, they warrant our remaining in favour of firm prices and to a considerable possible advance in the event of certain occurrences of a military character which can be neither discounted nor prevented.

Outside of the increase in freights, which governs European prices, we may state that coffee is the sole article that has not been subjected to advance since the war, in proof of which, on June 30, 1914, No. 7 was quoted at Santos at 5,000 Reis, with exchange at 16 pence, and that it is quoted to day at 5,400 Reis, with exchange at 12½ pence, which is much cheaper.

Without the war, which has materially restricted speculation, the intrinsic situation would justify much higher prices; in spite of the war, the present prices do not reflect the strong statistical situation of the article.

CORRESPONDENCE.

THE EDITOR,
Planters' Chronicle.

Basket Planting.

Dear Sir,—From long and successful experience of Basket Planting I am convinced that the large percentage of turned tap-roots C. J. H. complains of is the result of bad sowing of the seed into the Baskets. Unless coffee seed is sown flat-face down the result is bound to be a kink in the root, if not a Bugle. One commonly sees coolies pushing seed into the soil of the basket with their fingers and this cannot guarantee that every seed will rest face-downwards. The planting out of the Basket into the field is a simple operation but it is essential that the lower half of a nine inch basket be cut off to insure getting a stiff enough tap-root to resist the downward pressure of planting out. I have no objection to a double tap-root, they are quite common, and start from soon after germination.

L. P. K.

Honnametti Estate,
Attikan P. O., Mysore Province.
21st Sept., 1916.

THE EDITOR,
Planters' Chronicle.

Supplying Vacancies in Coffee.

Dear Sir.—Mr. Hayward's letter on this subject, which appeared in your issue of the 16th instant, is of interest to all planters.

The difficulty experienced in raising supplies in old coffee is known to all of us.

Baskets are good, if the plants are not allowed to get too big; four to six leaf seedlings for putting out in June are quite all right; but, we want, most of us, bigger plants for this sort of supplying.

I now use Elliot's Transplanter—Manufacturers: A. T. F. Parkes & Co., Ltd., Birmingham. The tool is simple to use, and is strongly made; it is merely a spade with a curved blade. When lifting plants with it a trench is dug around the end of the bed; the spade is pressed into the ground on the outside of the plant, whereby the outer half of the cone is formed; the second man places the carrying tin in position and holds it so, while the spade man makes the inner cut, and then bends the spade with its cone of earth outwards; when the plant in its cone is lying in its carrying tin at an angle of about 45° the spade is removed by a drawing, not lifting, movement. The spade should be washed, just as the brickcutter washes his mould each time. I find for two spades 150 carrying tins are needed. These tins are made with four corrugations: they are not expensive (Rs. 8 a hundred). I have not seen these Transplanters advertised by any of our Southern India firms, but Messrs. T. E. Thomson & Co., Calcutta, stock them.

RANDOLPH H. MORRIS.

THE EDITOR,
Planters' Chronicle.

Open Pit *versus* Closed Pit.

Dear Sir,—In your issue of the 16th instant Mr. C. J. Hayward refers to the difficulties he has experienced in supplying vacancies in coffee with basket plants, and states that he has subsequently found enormous numbers

with turned tap-roots. This is a far more general defect in planting both tea and coffee than is usually imagined, and is to a great extent the explanation of the many stunted and unproductive plants one sees on estates.

It appears from Mr. Hayward's letter that he puts out his basket plants in August or even September. This delay is a serious disadvantage, for if the baskets have been filled with good soil, the seedlings make so strong a growth towards the end of the rains, that the tap-roots generally reach the bottom and take a twist on the hard bamboo below. To avoid this the plants should always be put out at the very beginning of the monsoon, before the tap-root starts the rain growth, when if the bottoms of the baskets have been cut off, as they always should be, the tap-root will naturally extend straight downwards into the soft pit soil without the deviations complained of. I have however found that the chief cause of the bent tap-root is attributable to the existing system of filling in the pits immediately after they have been dug. The coolie is very apt not to scoop out a deep enough hole in which to insert the basket; and when he finds the basket protruding somewhat above the cone of soil, he very deftly presses the basket down to the level he wants. This misguided pressure not only directly bends and twists the tender tap-root to one side, but also tends to form a hard pan of earth at the point of the root just where the softest soil should exist. The remedy here lies in not filling in the pits at all till the plants are actually put into them.

A very simple method of carrying out this form of transplanting is to employ two distinct gangs of coolies: one of women to bring the plants to the pits, and the other of men to shovel in the soil with mamooties. The two gang maistries use a rope which they stretch in a straight line along the middle of the open pits, and the women hold the baskets alongside this rope, with the top edge of the baskets slightly raised above the ordinary level of the surrounding ground, to allow for any subsequent sinking. When the maistries pronounce the alignment correct the signal is given to the men to shovel in the loose earth; and while this is being gently tamped down, and the ground cleared up round the plants, the women are busy bringing in another relay of seedlings. This plan ensures straight and even planting, and obviates altogether any upward pressure against the tap-root. By holding the baskets along the rope a correct alignment is obtained towards the right and left, while by making all the women face in the direction of the plants already put out, a straight line is continuously secured from front to rear. After a line of pits have been planted up, the two maistries remove the rope to the next row of empty pits behind, and so the transplanting goes on line after line with military precision; and if proper discipline is maintained the work is done with astonishing rapidity, and far faster and better than by the existing system of letting individual coolies scoop out and plant at their own sweet will. The main thing is never to let the coolies put any earth into the pits, till all the plants are held ready over them. If not closely supervised, the coolie prefers to fill in the greater portion of the pit and restfully places the basket down on the earth to save the trouble of holding it up for a few moments. Such carelessness must be prevented at all costs if the benefits of the open pit system are to be realised.

Filling in the pits immediately after they are dug out is a pernicious practice, without a redeeming feature to uphold it. It is one of the many unsuitable methods that have been blindly copied from Ceylon, where the conditions are very different from those under which the planter works in India. In Ceylon the soil is less porous and of poorer quality, and most of the estates are on steep hills where the dug out soil is rapidly washed away in the heavy rains, hence the necessity of at once refilling the

pits. By having to do this the Ceylon planter sacrifices many agricultural advantages, but he saves his soil, which to him is of prime importance. The above conditions however do not, with few exceptions, prevail in India, and therefore there is logical reason for imitating Ceylon in this direction.

To put out a plantation of tea or coffee with the greatest initial gain, the pits should invariably be dug during the winter months, as soon as possible after the monsoon weather has ceased. The excavated soil should be heaped above and below the pits, so as to leave level ground on either side for the alignment rope that is held across by the maistries as before mentioned. Both the pits and the loose earth should then be left untouched till required for actual planting at the beginning of the next monsoon. The following advantages accrue from this method: (*a*) the sides and bottom of the pits, and the excavated earth outside, are being "weathered" all this time, that is, the earth that will be round the future plant is being ærated and sweetened by exposure to air, sunshine, heat, cold, dew, rain, etc.; (*b*) many desirable chemical changes take place; (*c*) beneficial bacteria are generated in what was hitherto dead subsoil; and (*d*) if any of the pits cannot be planted up, they can be left to continue the process of "weathering" till next season, without the cost of re-digging them as is entailed at present. In fact the longer pits are left open, the better they are for planting, and more especially for filling vacancies. I do not however expect that long cherished conservative methods will readily be altered by mere statements on my part, so all I ask for is a little personal experimenting on the lines I have indicated. The results that will ensue will, I am sure, convincingly show that open-pit planting is not only more economical, but has many and permanent advantages over the system now in vogue.

J. B. LESLIE-ROGERS.

Ootacamund,
23rd September, 1916.

Balehonnur,
25th September.

Basket Plants.

Dear Sir,—With reference to the remarks of Mr. C. J. Hayward in the Planting *Chronicle* of the 16th instant as regards the disadvantages of Basket plants, I fully endorse his opinion. It is two years since I discontinued basket planting not only for the reason suggested by Mr. Hayward as regards the safety of the tap-root but also because unhealthy and shabby basket plants were not always rejected owing to the rather heavy cost already incurred, and also that one can never always be sure that the basket plants will be put in the pits with proper care by the coolies, besides which, the cost of carrying them to the field is high, in addition to the initial outlay. Further if anyone chooses to put double plants in the same pit it will be difficult to follow in the case of basket plants.

The right way is to revert to the old system of making nurseries on good virgin soil and rejecting the same every two years, the best and most healthy plants, after the tap and the feeder roots have been examined, should be taken to the field and planted with the tap-root straight, the rest should be rejected.

The difficulty lies in finding a suitable place for a nursery, conveniently supplied with water. Some of my brother planters may have the idea that a level piece of ground is absolutely necessary. I have tried sloping places, which have given equally good results, though not better. In any case, the cost of making a nursery should be much less than that of basket plants.

S. L. MATHIAS.

The Planters' Chronicle.

RECOGNISED AS THE OFFICIAL ORGAN OF THE U. P. A. S. I., INCORPORATED.

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THE U. P. A. S. I.

(INCORPORATED.)

Contents.

We publish the minutes of an Extraordinary General Meeting of the Anamallai Planters' Association and the minutes of the General Meeting of the Coorg Planters' Association. In his report, as delegate to the Annual General meeting of the U. P. A. S. I., Mr. Robinson referred to the Resolution passed about Roads and Communications, which resolution has been forwarded to the Secretary to Government of Madras, who has replied that the subject has been transferred for disposal to the Hon'ble Mr. S. B. Murray who is in charge of the Roads and Buildings Branch of the Public Works Department.

The Delegates to the U. P. A. S. I. Annual General Meeting in their report referred to the delays in delivery of mails in Coorg and needless delay in the delivery of mails in North Coorg on which a resolution was passed, and was forwarded to the Post Master General, who has replied that the former matter is still under correspondence with the Superintendent of Post Offices, Mysore Division, and that the latter will receive his best attention.

We publish the weekly article on Markets, Prices and Statistics by R. D. A.

Some interesting correspondence appears on cultivation and spraying of coffee by "Sophos" and the sad news forwarded to us of Mr. Lechler's death from para typhoid at Busra.

On the other hand Mr. Byrne writes us that no doubt his many friends will be glad to hear that Captain H. J. O'Reily, late of Yendayar Estates has been awarded the D. S. O. for distinguished gallantry.

SOUTH INDIA PLANTERS' WAR FUND.

	Rs.	A.	P.
Amount previously acknowledged	51,452	4	8
The Hon'ble Mr. E. F. Barber	400	0	0
Messrs. Barber and Pascoe	75	0	0
Mr. C. H. Browne	40	0	0
Mr. K. H. Lysons	40	0	0
Mr. S. H. Dennis	40	0	0
Total...	52,047	4	8

DISTRICT PLANTERS' ASSOCIATIONS.

Anamallai Planters' Association.

Minutes of an Extraordinary General Meeting of the Anamalai Planters' Association, held at the Club on 11th September, 1916.

PRESENT.—Messrs. J. Hatton Robinson (Chairman), B. M. Behr, E. W. Simcock, E. N. House, J. I. Jones, J. E. Sampson, A. C. Cotton, J. A. R. Lloyd, D. Cooper, C. K. Pittock, R. Fowke, A. A. Robb (Honorary Secretary). The Amalgamated Tea Estates and Anglo-American Direct Tea Trading Company's interests were represented by proxy.

(1) Minutes of the previous meeting were read and confirmed.

(2) Delegate to U. P. A. S. I., meeting at Bangalore. Mr. Robinson read his report which is as follows :—

Gentlemen,—At your request I attended the twenty-third Annual Meeting of the U.P.A.S.I. opened in Bangalore on the 14th of August 1916.

A new method of conducting the meeting was inaugurated and worked very satisfactorily. On the opening day delegates were divided into Committees. These Committees dealt with the various subjects on the Agenda, matters were fully discussed and resolutions prepared for opening meeting.

This method is a much more businesslike way of doing things, and much time was saved on the open meeting.

I don't intend to bore you by repeating what you have already read in the Press, and will merely touch on the item which you asked me to bring up at the meeting and one, or two, other items in which you may be interested.

Under the heading of LABOUR you asked me to say that you considered that the Labour Department, should establish more out-agencies, and this the Director promised to do at the first opportunity.

It would be as well, perhaps, if this Association informed the Labour Department as to *where* it considered these new agencies should be opened ?

I complained of the incompetency of the Erode Agent, and you will be pleased to hear that this man has since been dismissed.

I also put forward your views about having high caste people employed as Agents in Agencies where low caste people were to be recruited, and requested that only suitable Agents would be employed in such agencies.

In replying Mr. Martin gave instances where the employing of caste men in such Agencies had proved most successful, but said my request would have his attention.

The assault on the coolies mentioned in the Director's report was committed on the coolies coming to the District, and I took it for granted that I would be only following your wishes by commenting on the same and saying that I hoped the Department would take the matter up with the highest District Government Officials in order that similar assaults would not be again committed.

You have read the Director's report and what he said in connection with the criminal tribes recently brought into this District.

I must say that it came as rather a shock to hear such glowing account given about these people.

I thought that Mr. Martin's remarks about our "Free Labour" were likely to give a wrong impression to other district delegates.

In the *Madras Times* I was, unfortunately, reported as saying that I considered these labourers were "unsuitable."

I have never contended that this labour was unsuitable and was very careful to avoid making such statement.

Those of us employing this labour are doing our utmost to make the experiment a success.

But an experiment about which, at your recent meetings there had been such a divergency of opinion, could scarcely, I considered, be regarded altogether as a success, and I said so.

At the meeting it was notified that the Executive Committee of the Labour Department had decided to invite a delegate from each district to attend their quarterly meeting in order to receive suggestions and to obtain the opinion of subscribers.

This is a matter which we should all very much appreciate.

ROADS AND COMMUNICATIONS.—As, by an oversight, proper notice had not been given, I had to get the consent of the Chairman, and all the delegates present to bring forward, on your behalf, a resolution in regard to the roads in the district.

My resolution, as you have already read in the *Madras Mail*, was as follows:—

"That the attention of the Government be invited to the state of the Roads in the Anamallai Distrtct, and that in regard to Road Contracts, steps be taken to remove an undoubted misunderstanding between the Public Works Department and the Planters."

I trust that what I said in this connection meets with your approval.

I see that we have "Roads" on the Agenda again to-day and I shall be glad to reply to any questions you may ask me, under this heading, when the matter comes up for discussion.

ST. GEORGE'S HOMES.—You have no doubt read the description of the work being done in the St. George's Homes at Kodakanal, so eloquently put before the meeting by the Rev. J. Breeden, the Principal of the Homes.

It is a subject in which all right thinking British people should be interested.

The problem of the bringing up of these children in this country is to-day employing the minds of many more serious thinking men than it did a few years ago. It is a matter in which the entire European Community of Southern India should co-operate.

I was surprised to see a short time ago, that the Committee of a well known Club had given a generous donation out of the club funds to these Homes. At the Meeting in Bangalore, a list was sent round and nearly Rs. 1,300 subscribed by the delegates present in the room, one delegate promising to support one child for life.

A resolution was moved from the Chair, calling the attention of the District Planters' Associations to the urgent need of support required by these Homes, and, Gentlemen, I earnestly hope that the same will meet with generous support from this Association.

PLANTERS' BENEVOLENT FUND.—Mr. Waddington's resolution was carried.

FINANCE.—The Accounts of the U. P. A. S. I. were audited by Chartered Accountants.

OFFICE-BEARERS FOR 1916/17.—Mr. J. S. Nicolls was elected Chairman, and Messrs. Tipping (Coorg), and Abbott (Wynaad), Vice-Chairmen.

It was proposed by Mr. Behr and seconded by Mr. Robb "that Mr. Robinson's report be accepted and that a hearty vote of thanks for his services be recorded."—Carried unanimously.

(3) Proposed visit of H. E. The Governor of Madras to the District.

The Meeting resolved itself into Committee and arrangements for His Excellency's visit were fully discussed.

(4) POST OFFICE.—Several members had complaints to make with regard to delay between despatch of letters from place of posting to receipt of such at their destination. Envelopes showing stamped date of despatch and delivery were produced, and in one case it was found a letter was in transit between two members using the same District Post Office. The Honorary Secretary was requested to bring the various complaints to the notice of the Superintendent of Post Offices and forward a copy of his letter to the P. M. G.

(5) ROADS.—The condition of the Ghat and District roads was discussed and the following resolution proposed by Mr. Cotton and seconded by Mr. Pittock was carried unanimously:—

"That this Association records its opinion that the cart road is at present in a far worse condition than has ever been known as before, particularly between miles 16/18 and 21/26·4 and that the method of repair at present employed on the various roads is a disgrace to the D. P. W."

(6) MINOR FOREST PRODUCE ASSOCIATION.—The Honorary Secretary A. P. A. was requested to forward to the Honorary Secretary M. F. P. a cheque for Rs. 400 to enable the latter to carry on the business of the M. F. P.

(7*a*) LABOUR CONTROL COMMITTEE.—Mr. E. W. Simcock was elected to attend the Meeting at Ootacamund on 16th October and represent this Association.

(7*b*) LABOUR MATTERS.—The following resolution was passed.

"That a Sub-Committee be appointed to collect all labour rules from the minutes of the Association and circulate copies of same with proposals for any revision of same if necessary."

(8) DEMARCATION OF ESTATE BOUNDARIES.—The Honorary Secretary was instructed to write to the D. F. O. and inform him that estate owners propose demarcating their boundaries by cairns with direction stones, as per plan given by Mr. J. Hatton Robinson.

(9) WESTERN OUTLET.—Mr. Behr kindly offered to give every assistance to the survey party, and the Honorary Secretary was instructed to inform the Dewan of Cochin that all members of the Association will be glad to give any assistance necessary to the survey.

(10) CINCHONA.—The Honorary Secretary was instructed to write to the Conservator of Forests and inquire if there is any truth in the rumour that Government propose opening land in the Anamallais under cinchona.

(11) IYERPADI COURT.—The Honorary Secretary was instructed to write and point out to the visiting Magistrate the inconvenience attached to the short notice of his inability to hold the Court on the fixed date, and to request that the Magistrate should in future telegraph to the Honorary Secretary advising him of the date on which he will hold Court.

(12) ASSOCIATION RULES.—The amended rules were read and accepted with the exception of the following alterations proposed by Mr. B. M. Behr and seconded by Mr. E. W. Simcock. "That the words 'such representative being a member of the Association,' as laid down in rule 4*a*, be added to 4*b*."

(13) BOYAN'S ADVANCE.—Mr. Pittock's resolution (seconded by Mr. Cotton) "That the resolution on Boyan advances passed on 3rd July should be put into force for 6 months from date" was not carried.

(14) FINANCE.—The Honorary Secretary was empowered to expend such sums as are necessary to carry out the ordinary business of the Association, but any extraordinary expenditure must be referred to the Committee of the Association.

MEMBERSHIP.— Mr. R. Fowke tendered his resignation as he is leaving the District. This was accepted with regret.

The Meeting terminated with a vote of thanks to the Chair.

(Signed) J. HATTON ROBINSON,
Chairman.
(„) ARTHUR A. ROBB,
Honorary Secretary.

Coorg Planters' Association.

Minutes of the General Meeting held in the North Coorg Club, on the 22nd September, 1916, at 2 p.m.

PRESENT.—Messrs. A. H. Jackson (Chair , H. M. Sheldrick, A. J. Wright, Lockie, (Messrs. P. L. & Co.). H. M. Mann, J. W. Irwin, H. T. Shaw, R. Hamilton, W. A. F. Bracken, F. Macrae, W. R. Wright, F. H. Sprott, C. G. Maclean, P. G. Tipping (Acting Honorary Secretary).

1. In the absence, through indisposition, of the Chairman, Mr. W. M. Ball, Mr. A. H. Jackson was voted to the Chair.

2. Read and confirmed minutes of last General Meeting held at the Bamboo Club, 1st June, 1916.

3. *Election of New Members.*—Mr. Randolph Morris, proposed by Mr. Hume and seconded by Mr. Tipping, and Mr. H. T. Shaw proposed by Mr. Tipping and seconded by Mr. Jackson, were unanimously elected members of this Association.

4. REPORT OF THE DELEGATES, U. P. A. S. I. CONFERENCE.—Mr. Chairman and Gentlemen. In accordance with your instructions your Delegates duly attended the U. P. A. S. I. Conference 14th to 18th August. A full account of the resolutions passed and business done in open meeting was published in the *Madras Mail.* The new plan of conducting the Conference worked most expeditiously: Various Committees were appointed and all matters were first threshed out in Committee. The open meeting business thus lacked something of the usual interest to the general public, but the plan was most satisfactory to the Delegates and Reporters, and proved a great saving in time.

Our resolutions regarding delays in delivery of mails in Coorg and any possible further tax on Coffee in the near future, were unanimously supported, and we also found an opportunity of putting in a word for the Coorg-Railway, as forming an indispensable metre gauge link for any Railway connecting the S. West Coast with Poona and the North.

According to your Committee's instructions we supported all resolutions which were brought up for the benefit of the Planting Community generally, and also arranged for the Deputy Director of Agriculture, Planting Districts, to visit Coorg in December. Dates of this tour will be communicated as soon as arranged.

Regarding the first Experimental Station for Coffee, your Delegates had then only one possible site to offer, and this was the one which Mr. James Chisholm kindly offered, by cable. Since then Messrs. Matheson and Co., through the kind offices of Messrs. Macrae and Mahon, have placed others at our disposal, no other offers have been received.

The suggestion of the Control Committee that delegates should be appointed from each District to attend the Control Committee meetings once or twice during the year to bring forward suggestions and other matters from their respective districts was unanimously agreed to.

Regarding Railways Mr. Richards made a very clear statement of the various schemes, and told us that the Coorg scheme figures largely in his instructions, and is in an advanced state, and that there is every hope of the first sod being cut next year. Mr. Richards will visit Coorg shortly to make a personal inspection of the proposed line and possible ghat outlets.

The Conference was attended by our Chief Commissioner, the Dewan Sahib of Mysore, Sir Thomas Holland, Mr. Richards, Mr. Stuart, Dr. Coleman, Mr. McRae and others. You will have read the speeches, and will no doubt have observed with satisfaction that the keynote throughout is one of sympathy with planters and their industries.

The Revd. J. Breeden in a moving address and appeal on behalf of St. George's Homes, which every one should read and consider, put the matter in such a light that the sum of Rs.1,280 together with a life subscription of Rs. 35 per mensem for the support of one child and another subscription of Rs.5 per month was raised in the room, in a few minutes.

We would earnestly invite this Association to adopt the admirable and useful suggestion brought forward in a resolution by Mr. Richardson, and unanimously carried: "That Associations should empower their Honorary Secretaries to order a copy of the Book of Proceedings for every member." It is a handy form of reference of past proceedings and accounts and contains a full report of Scientific and other lectures. This matter has been placed on the agenda paper for to-day, and we trust will meet with your unanimous support.

In conclusion we would like to draw your attention to the amount of time and work that is given by the Chairman, Planting Member and in a lesser degree by the Committee of the U. P. A. S. I. to the furtherance of planting interests generally and ask you to accord them a hearty vote of thanks.

The Chairman in a short speech congratulated the Association and Mr. P. G. Tipping on the honour done them by the delegates at the U. P. A. S. I. Conference in electing Mr. Tipping Vice-Chairman.

5. Mr. Macrae in a short speech of appreciation of the work done, proposed a vote of thanks to the delegates, this was seconded by Mr. W. A. F. Bracken and unanimously carrried.

6. COFFEE EXPERIMENTAL STATION.—The Honorary Secretary expressed pleasure at being able to inform the meeting that no less than 3 plots had been offered in Coorg, one of which he considered eminently suited for the purpose being situated on the Government Road about 2 miles from Sidapur, average coffee, on a northern slope and having the foundation of a bungalow already laid on the highest point and a suitable site for lines on a portion of a waste land bordering on the Government road. The Meeting was of opinion that there should be a guarantee at the time of handing over the plot to Government that the investigation of the causes and cure of such serious diseases, as Leaf Disease, Black Rot. Stump Rot, Borer, and Mealy Bug, should take a prominent place amongst the experiments undertaken, and that with the exception of this stipulation, the Scientific Department should have an absolutely free hand.

7. DISPOSAL OF SCIENTIFIC OFFICER'S ASSISTANT'S APPLIANCES.—The Honorary Secretary announced that he had been able to dispose of the Motor Cycle and the meeting welcomed Mr. Anstead's offer to take over the other appliances at a valuation and agreed that Mr. Anstead be asked to value the same when he visits Coorg in December.

8. WITH REGARD TO MR. ANSTEAD'S TOUR IN THE DISTRICT IN DECEMBER.—Members were asked to send in their names in good time to the Honorary Secretary so that a programme could be arranged.

9. R. G. A. MEETING AND INDUSTRIAL COMMISSION.—Delegates were not found to attend these.

10. LABOUR CONTROL COMMITTEE.—Mr. W. M. Ball was elected to attend this meeting and it was resolved to circularise members inviting them to send in suggestions, and any other matters that they wished to bring up before the Control Committee, to the Honorary Secretary, as soon as possible, for the instruction of their delegate.

11. S.I.P.B. FUND.—The meeting unanimously supported the Honorary Secretary in his view that monies from this fund should not be used for the relief of non-subscribers and their dependents.

12. COCHAR FUND.—The Honorary Secretary announced that apart from the amount collected on a list circulated by the Rev. F. W. Heycock, Chaplain of Mysore and Coorg, that in answer to his "General Appeal" he had received Rs.550 and that the three eldest children had already started for Loyedale, Ooty. Mr. Jackson proposed and Mr. J. A. Wright seconded a vote of thanks to Mr. Tipping for the prompt way in which he had dealt with this matter. In reply Mr. Tipping said that he was proud and pleased to tell the meeting that of the total sum subscribed over Rs.300 had reached him within 36 hours of issuing the appeal and the little that he had done had been a pleasure with such encouraging and generous support, that he had also received offers of further subscription, if necessary, from those that had already subscribed, but thought that they should not be asked; and that it was up to the districts in which Mr. Cochar had lived and served and to whitemen generally to do anything further that might be necessary. The subscribers agreed to handing over the fund collected to the Rev. F. W. Heycock for disposal on the lines already discussed, between him and Mr. Tipping.

13. BOOK OF PROCEEDINGS.—The meeting unanimously supported Mr. Richardson's U. P. A. S. I. resolution and registered their names for 21 copies to be sent V. P. P. direct to them, and resolved that all members be invited to send in their names direct to the Secretary, U. P. A. S. I.

14. The Honorary Secretary laid copies of a circular issued by the "Landholders of Coorg" Association, and read a translation of same, inviting attendance at a Ryots' meeting at Virajpet on the 23rd instant to discuss the Railway cess. The meeting was of opinion that, considering that the cess had been agreed to in 1915, this discussion was rather belated and superfluous.

15. Though the subjects of Roads was not on the Agenda Paper Mr. H. M. Mann asked leave to propose a hearty vote of thanks to the District Board of Malabar for the great improvement effected in the Malabar section of the Coorg-Tellicherry road, this was seconded by Mr. Bracken and unanimously carried.

16. Mr. C. G. Maclean addressed the meeting on a question of rice money, this question was ruled out of order till due notice had been given, but some informal discussion took place. The Honorary Secretary drew attention to past resolutions dealing with rates of pay and promised to place the matter on the agenda paper of the next General Meeting, if desired.

A vote of thanks to the Chair and Honorary Secretary terminated the meeting.

(Signed) P. G. TIPPING,
Actg. Honorary Secretary.

(..) A. H. JACKSON,
Chairman.

MARKETS, PRICES, AND STATISTICS.

Coffee.

Monthly statistics to 31st August.

	1916. Tons.	1915. Tons.	1914. Tons.
East India—			
Landed to 31st August ...	2,074	3,710	6,567
Delivered to 31st August ...	2,110	2,683	4,142
Stock on 31st August ...	1,359	2,486	2,672
Coffee of all kinds—			
Stock in U. K. 31st August ...	35,000	31,100	22,000
European Imports to 31st August ...	247,230	356,120	435,430
European Deliveries to 31st August...	246,535	371,180	434,472
European Stock to 31st August ...	207,000	242,765	429,000
*World's Visible Supply do ...	584,645	559,370	632,763

*An increase of 50,290 tons compared with an increase of 78,650 tons last year.

Brazil receipts to 9th September :—

1916.	1915.	1914.	1913.
3,489,000	4,017,000	1,809,000	3,755,000

Offerings at auction have been :—

	29—8 Sept.	Since 1st Jan.	Last year.
East India	Nil.	27,102	40,658
Costa Rica	1,969	93,276	95,002
Other Milds	976	61,625	134,494
Brazil	883	69,897	103,664
Robusta	Nil.	1,351	13,222
B. E. A. & Uganda	1,951	9,540	10,354

The small supplies in auction sold very steadily, many of the cheaper grades meeting with better competition as the demand runs more and more on Coffee "for price." *The Mysore Chamber of Commerce Report* dated 2nd October states that quotations are more or less nominal and there is no demand. Peaberry ranges from Rs. 15 to 16 per maund of 26½ lbs. Parchment Rs. 11/8. Native Rs. 10/4. Chickmaglur quotes, Peaberry Rs. 14, Native No. 1, Rs. 11/4, No. 2, Rs. 9/8, per maund of 28 lbs.

Tea.

The following figures showing the Export of Tea are published by the Indian Tea Association,

	1916. lbs.	1915. lbs.
Sailings to Great Britain—		
From Calcutta in August ...	20,788,012	27.361,217
From Chittagong in August ...	9.106,757	8,817,126
From 1st April to 31st August ...	78,943,089	72,020.324
Sailings to Australia and New Zealand—		
In August	706,378	640.873
From 1st April to 31st August ...	1,115,124	2,432,931
Sailings to America—		
In August	783.280	1.915,242
From 1st April to 31st August ...	1,288,992	2,639,440
Sailings to other places—		
In August	3,724.160	7.338,731
From 1st April to 31st August ...	11,857,444	10,125,729
Sailings from South India—		
In August	737,276	1.693.231
From 1st April to 31st August ...	7,083.361	9,016,312
Total sailings—		
In August	35.845,863	37,766,420
From 1st April to 31st August ...	100.288,010	96,224,736

The following were the sailings from South Indian ports in August:—

From Cochin—	
To Asiatic ports	11,508
From Tuticorin—	
To London	289,619
To St. John N .B.	376,476
To Colombo	47,280
To Bombay	5,685
From Calicut—	
To Bombay	6.708
Total...	737,276

The Export of Tea from Ceylon from 1st January to 18th September was, black 142,328,337, green 2,529,355 lbs. the corresponding figures in 1915 being 149,880,769 lbs. and 3,725,745 lbs. respectively.

The following quantities of Tea were exported from India to Russian ports during August. To Petrograd, 7,188 lbs. to Moscow 625.598 lbs. to Odessa 78,620 lbs. to Adivostock 849,033 lbs. to Tachelianbinsk 405,754 lbs. and to Dalney 7,500 lbs.

In the London Market smaller supplies met a stronger demand during the fortnight ending 11th September. No South Indian Tea was sold during this period.

The Report on Tea Culture in Assam for 1915 states that there were 779 estates in the District, 13 of which were opened during the year. The total area under Tea in Assam was 383,821 acres of which 358,891 acres were plucked during the year. The crop was 245,385.920 lbs. of manufactured Tea, an increase of about 18% over the preceding year, a yield for the district of 683 lbs. per acre.

R. D. A.

CORRESPONDENCE.

To The Editor of the *Planters' Chronicle.*

Cultivation and Spraying of Coffee.

Sir,—I have lately read the letter from Mr. J. B. Leslie-Rogers under the above heading in your issue of 16th September. If our planting methods are all as faulty as Mr. Rogers says they are, we must be in a very bad way. But I believe I am right in saying that Mr. Rogers' experience of coffee has not been extensive; and it is therefore not surprising that his views on cultivation should reveal the amateur theorist rather than the man who has bought, and dearly paid for, his knowledge. He begins by taking the recent Coffee Conference to task for confusing cause with effect, and then promptly —well, I would refer him to Psalm VII, 15. He writes:—"The cause (of leaf disease) is the marked and steady decline in the vitality of coffee, &c." It is surely a self-evident fact that the cause of leaf disease is the fungus which induces it, and nothing else. If the germs were not present, neither healthy nor "shuck" coffee could contract the disease, spontaneously or in any other way. The logical deduction from his contention would be that leaf disease is more virulent on weak trees than on healthy ones. This I deny, and I fancy most coffee men will bear me out. In fact I am tempted to go to the other extreme, and lay it down as an axiom that the healthier the coffee the worse the disease.

I understand Mr. Rogers to say, basing his assertion on the dicta of certain "old tea planters of North India," that coffee in Ceylon was wiped out by leaf disease owing to "the impoverishment of the soil by bad cultivation." Anyone can see in Ceylon (and in India too for that matter) the direful effect of digging and mamotie weeding on hillsides subject every year to a heavy rainfall; but was the havoc wrought by leaf disease in Ceylon due wholly to this? Even were I much better versed in the history of coffee in Ceylon than I am, I would not venture to dogmatise on the point: but I have no hesitation in saying that Mr. Rogers loses sight of two cardinal factors which probably contributed just as materially to the woeful result as bad cultivation—first, that coffee in Ceylon was grown in the open, and next that the air in Ceylon is charged with moisture all the year round. The advantage of shade has surely been proved to demonstration; and as leaf disease revels in Moisture, when it gets its teeth fairly into Ceylon coffee it was able to hang on till there was no coffee left. In this regard the dry weather from December to April is the salvation of coffee in South India. Leaf disease—*pace* Mr. Rogers—is no worse now than at any time during the last twenty years or more; and I think planters are well assured that though the pest does a certain amount of harm every year, varying with the virulence of the annual attack, and will go on doing this till the end of the chapter, it will never kill their coffee outright as, seemingly, it did in Ceylon. Mr. Rogers' prognostication, that a like fate awaits South Indian coffee, is a *brutum fulmen*, and it need not give any South Indian planter a sleepless night. It would be just as reasonable were I to point to the long lines of blackened stumps on some of the Coonoor Ghat Estates, marking what were, not so very long ago, rows of fine coffee, and then to prophesy that the same fate will soon overtake the coffee in other Districts, losing sight of the essential fact (which I think all coffee men in Mysore, Coorg, and Wynaad are now assured *is* a fact) that, owing to the light rainfall, the Coonoor Estates never had a chance of throwing off green bug, while, per contra, the heavy rain from June to August that Estates on the Western Ghats receive clears off the pest so effectually that here it never can do anything approaching the same damage.

Mr. Rogers next says that "on looking up records referring to coffee "growing during the past half century, the most remarkable fact that "obtrudes itself is the very scanty cultivation coffee has hitherto received." It would be interesting to know what "records" he refers to. Certainly they could not have been representative of what has been done in the past, because all the methods of cultivation put forward by Mr. Rogers himself as novelties have long ago been tried. He says "the spacing between plants has "been too close." Here I am at one with him, and had I to plant my tote over again, I would discard the old-time distance of 5' x 5'. But I have tried the distance Mr. Rogers recommends—8' x 8'—and it involves a needless waste of ground. The point to aim at is to get the maximum number of plants into a given area, allowing each plant ample room for feeding and foliar development. This object, I take it, is achieved when the branches of mature trees touch without interlacing; and when coffee is treated as a bush and not as a tree, I would put the ideal distance at 6½' square for ordinary land and 7' square for exceptionally rich land. The difference between 8' and 7' reads like the difference between tweedledum and tweedledee; but it means a difference of 200 plants per acre, which is a big consideration. Mr. Rogers goes on "the pruning has been too heavy and fanciful." Just what he means by "fancy" pruning, I do not know; and there are occasions when heavy pruning is as necessary for coffee as for tea. But if handling was done regularly and systematically, the occasion for heavy pruning would never arise. And herein, in my view at least, lies the chief reason for the smaller crops of these latter days, as compared with the crops men obtained in the brave days of old. In this matter of handling we have all been backsliders from the golden rule set up by the planters of old—to handle properly and to handle often; and we pay for our defection in smaller yields. We leave every year a lot of wood on the trees which is merely pruned off after crop, and a large part of the strength of the trees is wasted in nourishing this useless wood. I would lay down this rule. In June, after the April flush has had time to develop a little, clear out the centre and select the bearing wood for the next season. Retain as far as possible a secondary opposite to each bearing secondary, and take off and *systematically keep off* everything else. Rub off each succeeding flush as it appears. Let the whole energy of the tree be directed into wood that will serve a useful purpose—the wood in bearing and the wood that will bear the following year. The result will be much longer and stronger wood than we see on coffee now, when superfluous branches are left on the trees, only to be taken off in the annual pruning. And better wood will surely mean better crops, both in quantity and quality. With handling carried out in this way, pruning will be a very simple operation, for it will merely consist in taking off wood that has borne crop. Doubtless the annual attacks of leaf disease over a long series of years have affected the vigour of our trees to some extent. We cannot get coffee clearings to come right away from the start as they did in the old days, because we cannot breed seedlings with the old vigour from seed taken from our more or less debilitated trees. I do not doubt that the decrease in crop is due to this cause in some degree; but I am confident that our neglect of handling is responsible to a far greater extent. Mr. Rogers next says "bulk manure has been applied near the surface." The feeding roots of coffee are always near the surface, and to bury manure of any kind deep is simply to place it out of the reach of those roots. I know that scientists have told us to try to induce feeding roots to go deeper down in order that they may suffer less from drought; but my experience is that you cannot convert a surface feeder into a deep feeder by any such device as putting in manure deep. He next says

"shading operations have been on empirical lines." I am not sure what force the world "empirical" is intended to have in this connection. Its primary signification is "derived from or known by experience," and in planting matters experience is the safest guide. What does Mr. Rogers propose to substitute for it—theory? Most planters follow quite sound rules in the matter of shade. They select the tree or trees they have found most suitable; they keep the shade well above the coffee, so that a reasonable amount of light may be admitted, and the free circulation of air may not be impeded; and they regulate the shade according to the facing, leaving more on a hot South or West face than on a cool North one. If these rules are "empirical," in Mr. Rogers' sense of the word, how does he propose to better them? He goes on "millions of tons of vegetable "matter have been left lying on the ground.....the main purpose it has "hitherto served is to have formed ideal conditions for breeding myriads of "spores and insect pests." I know that some planters of experience held that the spores of leaf disease while latent find a lodgment in mulch; but if they are right, why is leaf disease always just as much in evidence on a clean tote as on a mulched one? The question certainly admits of argument, but Mr. Rogers states it as a proved fact.

Mr. Rogers then propounds his system of cultivation, and he asks every planter to try it "on an acre or two of level or comparatively level land." This reservation in favour of level land I take to be a tacit admission that all the digging he suggests would play havoc—as it most undoubtedly would—on any land steeper than a very moderate slope, that is, on most of the land on which South Indian coffee has necessarily been planted. Suppose, for the sake of argument, that the experiments were the brilliant successes Mr. Rogers considers they would be; what would be their practical value if they could not be applied to the Estate as a whole? As to the system itself, there is nothing in it that planters did not know, and try, long ago. When I first went into coffee, twenty-three years ago, the almost universal practice was to "fork (or dig) deep at the beginning of winter," in or about November. Some men were content with this: others "followed it up with light mamotie "hoeings." Some men kept their totes clean all the year round: others (of whom I was one) "handweeded round the plants and sickled in the lines," in the monsoon. Then, most fortunately as I hold, Dr. Lehmann showed us the error of our ways. In effect he said:—"Stop the digging altogether. Grow a "tree as shade which will give a copious mulch of good manurial value, and "then do all you can to conserve that mulch." That I consider was the most valuable advice ever given to the coffee planter by a scientist. I took that advice, and I have never regretted it. For shade, I have Silver Oak and *Erythrina lithosperma*, and I wish I had only the latter. This tree I regard as in every respect the best shade for coffee that has yet been tried. It stands any amount of lopping. Even when it is shedding its leaves, it carries a good head of foliage, being only semi-deciduous. None the less, the leaf-fall is phenomenal in quantity, and it must have a considerable manurial value, as the leaves contain over 1% nitrogen. During the monsoon this heavy mulch decays, adding each year to the soil a quite appreciable layer of leaf mould, or—to use a much abused word—"humus." At any time the soil under its covering of mulch is free: it is shielded from the desiccating effect of the N.E. winds and sun during the annual dry period: weeds are kept down: and I have no wash. To me, the drawbacks to forking or digging in a surface feeder like coffee, and on the abrupt slopes on which all South Indian coffee stands, are so marked and so incontrovertible as to be outside the pale of argument. During the wet season the trees develop an intricate system of feeding roots a little below surface; and it is essential to their well being that these

roots should be allowed to perform their office undisturbed. Then, just as the trees have completed their work of root building and are in the best condition to withstand the hot weather, in goes the fork or down comes the mamotie, and the masses of fibrous roots are mangled or cut beyond all hope of repair till the following season. I have seen forking and digging defended on the ground that fruit trees are root-pruned in the Winter at home to increase their fruitfulness. But in this case the operation is carried out with the utmost care. Each tree receives individual attention: a trench is dug at a considerable distance from the tree: all the fibrous roots are carefully preserved, only the large roots being severed. Each cut root is trimmed and coated with tar. What analogy is there between meticulous work of this kind and the crude work done by a cooly armed with mamotie or fork the fibrous feeding roots in the latter case being hopelessly lacerated? Then, again, the inevitable result of forking or digging on the steep slopes of coffee totes is wash in the rains. Mr. Rogers says, as many men have said before him, that "wash does not take place if there is an intelligent system "of deep drainage." But my experience is that if the surface soil is disturbed by forking or digging, wash you will have as surely as the sparks fly upward, be your "system of drainage" never so perfect. A very elaborate system of contour drains may to some extent prevent the top soil from being carried away altogether; but there will still be wash between the drains. In a new coffee clearing digging might be permissible for the first two years to get the soil into a good state of tilth. There would be no feeding roots between the lines to injure, though loss of soil by erosion in the monsoon would still go on. But once the coffee is in bearing, I consider digging should be stopped for good. I would not have these remarks misunderstood. I am fully aware of the benefits claimed for 'hoeing' in the aeration of the soil, in rendering it permeable to the delicate feeding roots of the crop occupying it, in conservation of moisture during hot weather &c.; and in the case of some cultivation, tea for example, it is indispensable. But the coffee planter has to remember that his product is perforce planted on steep hill-sides, and that it has to face every year a very heavy rainfall. He has then to ask himself whether, in these special conditions, the drawbacks inseparable from digging do or do not outweigh its advantages. In my view they do. It must be harmful in the extreme to a coffee tree to have all the fibrous roots it has elaborated destroyed at one fell swoop; and top soil is to a surface feeder like coffee what his life blood is to a man. And the coffee planter who, after weighing the pros and cons, decides against digging, can comfort himself with the reflection that with shade of the right class, and with a carefully preserved mulch, he can to a great extent give his coffee all the benefits to be derived from 'hoeing' without any loss of his vital surface soil.

If I may venture a word as to cultivation, I would say 'Let all forking or digging be tabu. Grow a good jat shade tree (*E. lithosperma* is in my opinion facile princeps) which will yield a heavy mulch. From April each year institute a system of selective hand-weeding. Eradicate all grass, but leave innocuous weeds like indigenous legumes, ageratum, &c. In the dense shade of mature coffee, if it is regular, they will never become rampant. In borer patches, &c., where they *will* get out of hand, sickle them. In all open spaces with sufficient light, grow a good legume like *crotolaria striata*. Directly the heavy rains are over, clean weed the tote by hand, and bury everything in shallow pits between every four trees. Keep the tote clean till the following April, for weeds undoubtedly do harm in hot season by absorbing moisture when there is no moisture to spare. By April the ground will again be covered with a heavy leaf-mulch. Thenceforward till the next

November put the selective weeding again in force. Coolies when weeding are apt to rake up the mulch into heaps. 'Be careful that it is not disturbed, but is left evenly spread over the surface.'

Doubtless my views will be dubbed old fashioned, and in some respects I know they are at variance with pretty theories. But theory never yet put a rupee into a planter's pocket, and never will; and I do claim that the course I recommend is based on experience which, as I said at the beginning of this screed. I have bought and paid for.

Apologising for the inordinate length to which my remarks have run,

Yours faithfully,
SOPHOS.

Curzon Estate,
Kotagiri P.O., Nilgiris,
30th September, 1916.

THE EDITOR,
Planters' Chronicle,
Bangalore.

Dear Sir,—It is with the deepest regret that I have to report to you the death at the base hospital Basra, of para typhoid fever, of Mr. F. G. Lechler, 2nd Lieut., attached 62nd Punjabis, I. A. R. O.

Mr. F. G. Lechler has been in charge of the Madanaad Estate, Kotagiri, for the past 10 years. Always popular wherever he went, and a thorough good sportsman. He joined the I. A. R. O. in February 1915, and after a course of training at Rawalpindi, saw quite a lot of service on the Indian Frontier.

In December 1915 he was sent out to Mesopotamia with a draft, and he has been on active service in that country ever since, and has come through much fighting and many hardships unscathed, until seized with this attack of para typhoid, which seems to have carried him off in a few days' time.

He will be much missed by many good friends on these Hills and the Shevaroys, where he was also well known.

Much sympathy is felt for his parents, Mr. and Mrs. W. I. Lechler, of Inglewood, Yercaud.

Yours faithfully
R. N. C. GROVE.

THE TEA TRADE.

The bulk of Java's tea products is generally shopped to Amsterdam and London.

Owing to abnormal market conditions, a large percentage of Java tea, estimated for the year, 1915 at 93,500.000 pounds, was sold direct in Batavia for shipment to Russia, Australia and America. Shipments to Amsterdam, the principal Dutch market, amounted to 219,382 chests, equal to 22,815,209 pounds, which is the highest figure on record; 205. 209 chests, or 21,682,100 pounds, having been imported in 1914 and 190,809 chests, or 17,066,500 pounds, in 1913.

Imports of tea into the Netherlands during the second half of 1915 were less than during the first half, which is explained by the fact that all shipments must be consigned to the Netherlands Oversea Trust, with a guarantee that the tea is to be for domestic consumption only and not to be re-exported to any of the belligernt countries.

The tea is sold here at public auctions, of which 21 were held last year The average price yielded was \$0·24 per half kilo (1·1 pounds), the usual selling measure, as compared with \$0·21 in 1914 and \$0·16¾ in 1913.

The Planters' Chronicle.

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(INCORPORATED.)

Contents.

The Scientific Department publishes an article on Fungoid diseases of Hevea Rubber, including extracts from a lecture by Mr. Petch, the Ceylon Government Mycologist. So numerous and harmful are the diseases mentioned that we quote the Deputy Director's remark "How many of this particular fungi are present on the Rubber in S. India await the investigation *of our hoped for Mycologist.*" Included in the same article are Indian Tea Statistics.

We publish the proceedings of the Annual General Meeting of the North Mysore Planters' Association and the proceedings of the West Coast Planters' Association.

We publish a letter from Mr. E. A. Hughes in reply to Mr. G. V. Scovell's letter in the *Madras Mail* commenting on Mr. Hughes' Motor Cycle Ride from Bangalore to Madras.

Mr. Leslie Rogers writes on Coffee Leaf Diseases and gives the authorities for which Doctor Coleman asked and we hope that we may hear again from the latter.

Mr. Wilson writes of his experience of spraying with Bordeaux Mixture for leaf disease and is of opinion that "if it is done properly it will repay one for all the trouble and expense."

We have been asked by the Director of the Labour Department to notify that Mr. F. W. Winterbotham will take up the duties of Superintendent of the South Canara Circle from the 1st of December 1916.

The Secretary. U. P. A. S. I, will be absent from Headquarters from 14th to the 17th October at Ootacamund in attendance on the Labour Control Committee Meeting to be held on the 16th instant.

SOUTH INDIA PLANTERS' WAR FUND.

	Rs.	A.	P.
Amount previously acknowledged	52,047	4	8
Mr. J. J. Murphy	200	0	0
Mr. G. R. Pearse	20	0	0
Mr. R. Lescher	30	0	0
Mr. R. H. Crowther	10	0	0
Total...	52.307	4	8

SCIENTIFIC DEPARTMENT, U. P. A. S. I.

Fungoid Diseases of Hevea Rubber.

The Times of Ceylon recently published an account of a lecture by Mr. Petch, the Ceylon Government Mycologist, in which he deals at some length with various fungous pests of Hevea, and made some interesting recommendations for their control.

Much of the lecture was devoted to Root Diseases of which a number of specific forms have been worked out for Ceylon. How many of these particular fungi are present on the Rubber in S. India await the investigation of our hoped for Mycologist. Some of them certainly are present, possibly all of them and others to boot.

Mr. Petch once more emphasises the point which has often been made by our own Scientific Department that the general treatment for all Root Diseases is hard work. The method is put briefly as follows, "Extract all dead roots following up the laterals as far as possible; burn all diseased roots on the spot; surround the area with a trench two feet deep, throwing the earth excavated towards the centre; fork over the patch with Lime at the rate of at least one ton an acre."

"*Fomes semitostus*, more correctly called *Fomes lignosus*, has been proved to originate on a large variety of stumps, practically covering the whole range of flowering plants, and this being so Mr. Petch raises a note of warning about the Hevea stumps left when thinning out is done. Jungle stumps have disappeared on many estates due to natural-decay, but now-a-days nearly every one is thinning out each year and a new crop of stumps will occur in consequence and it is quite possible, that unless care is taken, there will soon be a recrudescence of Root Diseases originating from these stumps.

Mr. Petch says, "it has now been definitely determined that these stumps, a few inches only above the surface, can serve as centres of origin for *Fomes semitostus*, *Ustulina zonata*, and *Poria hypobrunnea*. When Hevea is felled the roots must be extracted. It is of course cheaper at first to cut them off at ground level, but it will come the most expensive in the end. If it is impossible to get out the roots, the tap root should be extracted to a depth of two feet, but it should be borne in mind that this is only the second best method."

"Another danger arises from abandoned Tea under Rubber. This was found some years ago to serve as a source of *Ustulina* which spread from the Tea to the Rubber. It is now giving serious trouble on some estates in connection with *Fomes*. *Fomes* either originates on the Tea stumps and spreads from them to the Rubber, or it utilises them as a means of passing from one Hevea tree to the next.'

"*Fomes semitostus* has not hitherto been regarded as a Tea root disease, but I have recently seen a case of *Fomes semitostus* on Tea quite apart from any rubber, and, consequently, do not doubt that the fungus can originate on Tea stumps."

All this means the rigid adherence to the careful sanitation of estates, the removal of dead stumps, dead wood, and dead or dying inter crops, a practice which has been preached from the first by the Scientific Department of the U. P. A. S. I.

Botryodiplodia theobromae, the fungus which causes 'die back,' is chiefly a saprophyte, it prefers dead and decaying wood. But the fungus can act as a parasite and this raises the question what is to be done with the Hevea logs, left after thinning out is done; can they be left to rot in the plantation or must they be removed?

The *Botryodiplodia* develops in a very short time. "The ideal way would be to remove the logs as soon as they are felled but that is impracticable. Something, however, can be effected by stripping off the cortex and removing that as soon as the trees are felled, as the rapid development of the fungus is chiefly in the cortex. The danger from *Botryodiplodia* exists chiefly in the first few weeks after felling. When the log is evidently in a state of decay the *Botryodiplodia* stage is over. There still remains the question whether it is advisable to remove Hevea logs because of the possibility of the development of other fungi? It is certainly a sound policy but is it worth the expense? I have never seen *Fomes semitostus* develop on Hevea logs, though I should not be surprised to find it on them in damp situations, or low lying land, or under dense shade. *Ustulina zonata*, however, could develop on Hevea logs in any situation. Taking all things into consideration, I should advise that Hevea logs be barked immediately after felling and the bark removed and burned as soon as possible; that on low lying ground the timber should certainly be removed; and that it would be preferable to remove it in all cases."

On the subject of Canker produced by *Phytophthora* as described by Mr. McRae in his lecture at the Annual Meeting, Mr. Petch advises the following treatment in preference to clay and cow dung, or tar and tallow. In the case of the former he has not found good results in Ceylon, and this objection to the latter is that the coolies are apt to tar Canker patches without cutting them out.

"When the tapped surface shows signs of decay it should be brushed over twice a week for three weeks with a 20 per cent. solution of Brunolinum. This does not mix with water unless soft soap is added. The proportions are one gallon Brunolinum, four gallons water, and one lb. soft soap. Dissolve the soft soap in the water, add the Brunolinum and stir it up vigorously. If any difficulty is found in mixing it should be worked up with a syringe. The Brunolinum separates out on standing and it is necessary to distribute the mixture to the coolies in bottles so that it can be shaken at intervals."

An attempt is to be made this year to remove the fruits from the trees in their young stages to prevent the attack of the fungus which causes the well known 'abnormal leaf fall" during the monsoon.

Indian Tea Statistics.

The Annual Report of the General Committee of the Indian Tea Association (London,) for 1915-16 contains as usual much that is of interest to Tea planters who are interested in the movement of Indian Tea.

The Tea Crop of India from 1st April 1915 to 31st March, 1916, as compared with that of previous years is shown in the following table:—

Year.	Export of Tea by Sea.			By rail from Calcutta to Bombay.
—	North India.	South India.	Total.	—
1915—16	313,959,342	21,664,078	335,623,420	19,566,831
1914—15	276,745,757	21,188,406	297,934,193	8,406,103
1913—14	...	...	289,381,559	4,091,509

The area under Tea together with the production in different Tea growing countries of the East is shown below for the year 1914, the latest for which figures are available:—

—	—	Assam.	Bengal.	N.W. Provinces and Punjab.	South India	Total India.	Ceylon.
Area ...	acres ...	376,048	161,214	17,314	68,052	622,628	409,000
Production ...	lbs. ...	208,227,104	75,655,615	4,320,464	24,773,025	312,976,208	195,216 419

The latest figures published in the *Report of the Department of Agriculture* for 1915 show that the exports of Tea from Ceylon for 1915 amounted to 215,632,727 lbs. the first time that the exports from that Colony have exceeded 200 million lbs., while the area under Tea during 1915 is there given as 392,500 acres.

The Administration Report of the Madras Port Trust for 1915—16 gives the following quantities of Tea as shipped from the port of Madras:—

1912—13	...	4	tons.
1913—14	...	174	do
1914- 15	...	636	do
1915—16	...	2,800	do

The following Table shows the distribution of South Indian Tea during 1915:—

Destination.	Shipments from Cochin, Tuticorin, Quilon, Alleppey, and Calicut.	Transhipments at Colombo.
	lbs.	lbs.
London ...	18,460,932	322,421
America ...	1,675,631	850,464
Colombo ...	1,547,878	—
Indian Ports ...	561,922	20,133
Russia ...	9,275	1,210,925
Other places ...	8,108	—
China ...	—	500,501
Australia ...	—	1,090,715
Africa ...	—	101,553
Malta ...	—	5,150
Spain ...	—	2,500
Total...	22,355,124	4,104,362

RUDOLPH D. ANSTEAD,
Deputy Director of Agriculture, Planting Districts.

DISTRICT PLANTERS' ASSOCIATIONS

North Mysore Planters' Association.

Proceedings of the Annual General Meeting held at Balehonnur on the 25th September, 1916.

PRESENT :—Messrs. C. H. Browne, E. W. Fowke, C. P. Reed, E. C. Bolton, C. S. Crawford, G. V. R. Frend, S. L. Mathias, F. W. Hight, C. Danvers (President) W. H. Reed, (Honorary Secretary), *Visitor* :—Mr. R. Browne.

HONORARY SECRETARY'S REPORT.—Mr. Chairman and Gentlemen,—As I have been Honorary Secretary for only 3½ months I have nothing of importance to say about the affairs of the Association. I had the honour to represent this Association at the last U. P. A. S. I. Meeting, and as no instructions were given me I have no report to make. I need not review what passed at the Conference as you no doubt have read a full account of the Proceedings in the papers. What I wish to bring to your notice at this meeting is the great need of funds for the Saint George's Homes. A list will be circulated during the meeting and I hope every one will subscribe liberally.

As regards our finances, I am glad to report that the Association is in quite a satisfactory condition in spite of so many resignations. There are now 45 Estates on the register representing 8,354½ acres. Three Estates with a subscription of Rs.123-14-0 are in arrears.

The Revenue for the past year has been from subscriptions Rs. 4,375, interest from Fixed Deposit and Current Accounts Rs. 177-12-0, and with a cash balance of Rs. 2,164-12-7 brought forward from last year brings the total to Rs. 6,717-8-7. Against this the Disbursements amount to Rs. 5,283-1-7, which leaves the total funds at the credit of the Association at Rs. 4000/- on Fixed Deposit with the National Bank of India, and a Cash Balance to carry forward of Rs. 1,434-2-0.

BENEVOLENT FUND.—I have remitted Rs. 140 to the Secretary, U. P. A. S. I. Four Subscribers are still in arrears.

Gentlemen, I beg to submit my resignation of the Honorary Secretary-ship.

ACCOUNTS.—These were placed on the table and passed.

SCIENTIFIC DEPARTMENT.—Read letter from the Honorary Secretary, Council of Mysore Planters' Associations, regarding engagement of Assistant Scientific Officer by the Mysore Government. Mr. C. H. Browne was elected to represent this Association on the C. M. P. A. He was asked to draw up a scheme in conjunction with the representatives of the S. M. P. A., B. P. A. and the Mysore Government at a meeting to be held at Chikmagalore.

PLANTERS' LABOUR BILL.—Read letter No. H. O. C. 362/16'17 dated 30th August 1916 from the Deputy Commissioner, Kadur District. After a lengthy discussion, a reply giving this Association's opinion was authorised.

POSTAL ARRANGEMENTS.—The Honorary Secretary was instructed to write to the Post Master General regarding the Motor Car Service between Chickmagalore and Mudigere.

ST. GEORGE'S HOMES.—Proposed by Mr. E. C. Bolton, and seconded by Mr. E. W. Fowke, that a donation of Rs. 500 be given to the Homes, and that a list be circulated privately among members. Carried unanimously.

LABOUR DEPARTMENT.—Mr. W. H. Reed was elected to represent the Association at the Labour Control Meeting to be held at Ooty on the 16th October 1916.

ELECTION OF OFFICE BEARERS.—Messrs. C. Danvers, President, W. H. Reed, Honorary Secretary.

(Signed) W. H. REED,
Honorary Secretary.

West Coast Planters' Association.

Proceedings of a General Meeting held at the Malabar Club, Calicut, on the 27th September, 1916.

PRESENT.—Kerala Rubber Co., Ltd., per Messrs. Campbell Hunt (Chairman) and A. H. Robb; Wandur Rubber Syndicate, per Mr. Campbell Hunt; Malayalam Rubber and Produce Co., Ltd., per Messrs. A. C. Morrell and H. R. Carson Parker; Mooply Valley Rubber Co., Ltd., per Messrs. H. Halliley and S. J. Thomson; Pullangode Rubber Estate, Ltd,, per Messrs. H. Waddington and R. H. Crowther; Thodupuzha Rubber Co., Ltd., per Mr. C. F. Ewart; Calicut Estate Syndicate, per Mr. H. H. Tippetts; Eddivanna Rubber and Tea Co., Ltd., per Mr. R. Lescher (Honorary Secretary). Also present, Mr. B. Malcolm.

The proceedings of the last meeting were confirmed.

Before proceeding with the Agenda the Chairman referred to the great and irreparable loss the Association had sustained by the untimely death of the late Mr. John Christie, one of its oldest members, and proposed "that the Honorary Secretary do write Messrs. Peirce, Leslie & Co., Ltd., conveying sincere condolences from the West Coast Planters' Association." Passed in silence, all members standing.

302. ELECTION OF A MEMBER.—Mr. Bernard Malcolm was unanimously elected a private member on the proposal of Mr. H. Waddington, seconded by Mr. R. Lescher.

303. LABOUR CONTROL COMMITTEE.—Correspondence read. Proposed by Mr. Tippetts and seconded by Mr. Ewart "that Mr. Lescher attend Ootacamund October Committee meeting as W. C. P. A. delegate and that Honorary Secretary do circularise West Coast Association Labour Department subscribers to obtain their views and instructions."—Carried.

304. ROADS.—NADGHANI GHAUT.—Read correspondence and letter from Honorary Secretary, Nilgiri Planters' Association, *re* this ghaut within the Nilgiri limits. Proposed from the chair and carried "that the Honorary Secretary write the Honorary Secretary, Nilgiri Planters' Association and thank him for bringing this matter to the notice of the President, District Board, Nilgiris and the Nilgiri Planters' Association."

WANDUR-TIRUVALLI ROAD.—Several members present complained of this road and instances were given of holes deep enough to wreck any car. Proposed by Mr. R. H. Crowther and seconded by Mr. A. H. Robb "that Honorary Secretary writes calling the attention of the President, Taluk Board to the condition into which the Wandur-Tiruvalli Road has fallen."—Carried.

305. U. P. A. S. I. BOOK OF PROCEEDINGS.—Read Correspondence and resolution passed at Annual Meeting of the U.P.A.S.I., Bangalore, 1916, on this subject.

Proposed by Mr. Lescher and seconded by Mr. Morrell. "that each "member of the W. C. P. A. be provided with a copy of the Bangalore "Annual Meeting Book of Proceedings, cost to be debited to the Associ- "ation."—Carried.

306. INCREASE OF MALARIA.—Mr. Hunt spoke regarding the undoubted increase of malaria in his district and instanced this by giving figures of cases treated in his dispensary.

In	1914	... ...	699
	1915	... ...	1,052
to date	1916	... ...	1,,388

He pointed out that the local cooly if in need of medical attention had to go either to Nilambur (20 miles), to Manjeri (23 miles) or to Angadipuram (18 miles) and this surely pointed to the urgent necessity for a Government dispensary somewhere in the locality. Coolies, other than local Estate coolies and from much further afield were constantly appealing for treatment.

Mr. Hunt was asked to approach the President, District Board, as to the possibility of opening a Government dispensary in the vicinity.

307. TRAVANCORE TIMBER VALUES.—Papers laid on the table and recorded.

308. EXPORT DUTY ON CONTRACT TEA.—Correspondence read.

309. MADRAS COMMERCIAL MISSION TO RUSSIA.—Correspondence read and recorded. The Honorary Secretary was instructed to write and ask the Hon'ble Mr. E. F. Barber if Rubber is included in the Mission.

310. RUBBER GROWERS' ASSOCIATION. (LOCAL BRANCH.)—On the motion of Mr. Lescher seconded by Mr. Halliley, Mr. Campbell Hunt was elected West Coast representative to the Cochin meeting in November.

311. ST. GEORGE'S HOMES, KODAIKANAL.—Correspondence under this heading was read and noted.

312. REGISTRATION OF CARTS.—A general discussion took place on this subject which was on the Agenda under the name of Mr. Hunt. He said he considered we should again press for registration as it was now practically impossible to prevent bandymen blocking roads, driving without lights, and having protruding brakes and loads. No resolution was framed but the Honorary Secretary was instructed to write to the Honorary Secretary, Wynaad Planters' Association, to very kindly furnish him with a copy of the correspondence *re* timber traffic in Wynaad and Malabar (Tambracherry Ghaut).

313. REPORT OF THE W. C. P. A DELEGATES.

To the U. P. A. S. I. Annual Conference at Bangalore, August 1916.

DELEGATES : MESSRS. WADDINGTON AND LESCHER.—As your delegates carried with them no specific instructions from this Association to this year's Bangalore Conference, our report cannot but be somewhat colourless and brief; especially as full particulars of the conference can be gleaned from the U.P.A.S.I. Book of Proceedings. The Conference extended over four full days, the first three of which were in committee and the final day saw the Agenda gone through in its entirety.

314. The Pest Act was agreed to.

315. Mr. McRae's lecture on abnormal *leaf fall* was full of interest and has doubtless been read by all present, in the pages of the *Planters' Chronicle*. We hope that we are now nearer discovering the true origin of this fungoid which will enable us to take efficient steps to combat and even overcome, what at one time threatened to be a serious menace to rubber planters.

316. RUBBER GROWERS' ASSOCIATION.—A good many Estates have joined this Association. In his speech the Chairman referred to the undoubted benefits to be enjoyed from membership and said he could not think that any Estate would now hold back from joining. Estates who do not subscribe may be able to derive benefits by simply watching the actions of those Estates who have subscribed. This is not as it should be.

317. DOUBLE DUTY ON TRAVANCORE TEA.—We understand that this trouble is in process of being overcome, if not already overcome.

318. FACTORY ACTS AND REGULATIONS.—We are not affected by this Act as regards Sunday work. See Factory Act (XII of 1911,) Chap. I, Sec. 3, Clauses *d* and *e*.

319. PLANTERS' CHRONICLE.—A new cover design is apparently required for this. Any artist member of our Association should send in his effort to the Secretary, U.P.A.S.I. Personally we consider the existing cover neat and unpretentious, and do not see the need for a change.

320. U. P. A. S. I. BOOK OF PROCEEDINGS.—We recommend that each member of the Association be provided with a copy of same yearly on W. C. P. account to benefit the sales and thus help to decrease the deficit that yearly shows under this heading in the U. P. A. S. I. accounts.

321. ST. GEORGE'S HOMES.—The Hon'ble Mr. E. F. Barber introduced the Revd. Mr. Breeden to the Delegates present, at the same time bringing to their notice the undoubted merit of such an institution as the St. George's Homes, Kodaikanal. We have many War and other funds

claiming on us at the present moment and probably we are giving all we can. Still the St. George's Homes certainly deserve our attention and we trust they will be given due consideration and support after the declaration of peace, if the present condition of affairs renders it impossible now.

322. RAILWAYS.—One of the most interesting discussions at the meeting was on the question of railways. We had the advantage of Mr. Richards being present. He is drawing up a general programme relative to lines likely to be opened in the next 30 years and arranging that any line undertaken shall form part of a general scheme. We again reiterated our opinion that Mangalore—Arsikere and Wynaad—Shoranur schemes should receive early attention. Owing to the war it is unlikely Government would or could for some little time lay down the actual rails of any line but we pressed that the earthwork of the Vaigai Valley line should be put in hand.

323. SHIPPING.—We passed a resolution urging Government to take steps to replace losses of Mercantile shipping tonnage and some very interesting figures were given as to the ship building in progress in Germany and the United States.

324. BENEVOLENT FUND—Some alterations in the rules as to this were urged and carried by your Delegates. Subscribers can now at any time become Patrons without having to continue their subscriptions, on payment of the difference between what they have subscribed and Rs.200.

325. PLANTERS' CHRONICLE.—Owing to not hearing of them, we miss advantage of reading many agricultural bulletins and we carried a resolution that a list should be published in the *Chronicle* of all those Mr. Anstead hears of as likely to be of interest.

Mr. Hunt then addressed the meeting saying that as this was the eve of the departure of Mr. Waddington for Coimbatore, he wished to propose a sincere and hearty vote of thanks to this gentleman for the $3\frac{1}{2}$ years' energetic and untiring work he had put in as Honorary Secretary of this Association. We are not saying good-bye however, but *au revoir*. What the West Coast Planters' Association loses the Labour Department and the planting community in general gains. Mr. Hunt further proposed that Mr. Waddington be elected an Honorary Member of the Association.

Carried unanimously with acclamation.

Mr. Waddington in a few words returned thanks to the Chairman and members present, saying he felt deeply honored at being elected an honorary member of the Association and hoped to attend meetings whenever possible.

A vote of thanks to the chair and to the Honorary Secretary and Members of the Malabar Club for use of the room, terminated the proceedings.

(Signed) CAMPBELL HUNT,
Chairman.

(„) R. LESCHER,
Honorary Secretary.

CORRESPONDENCE.

25th September, 1916.

Motor Cycle Ride from Bangalore to Madras.

Dear Sir,—I have hitherto been unable to reply to Mr. G. V. Scovell's letter in the *Madras Mail* of the 31st August, with reference to the motor cycle and side-car run I made from Bangalore to Madras last month. I claim that the run constitutes a record for side-car and Motor Bike. It is to be remembered that I was carrying dead weight in the side-car which makes all the difference as any experienced Motor Cyclist well knows. Also that I did not set out from Bangalore with the intention of setting up a time record as the bet was I would not get through within 12 hours. Finding however that at about half way I had made such good time my machine a 1915 model, Sunbeam, 3½—4 H. P. was running so well I determined to push through. If I had travelled over the road before and had known it, I could have done very much better. I know, as Mr. Scovell points out, it would be difficult to miss the direct road if I had stopped to examine the different Sign Posts, but it would be interesting if Mr. Scovell would explain how much he could read on an ordinary Sign Post when travelling between 30 and 50 miles an hour as I was and at the same time watching the road surface, traffic, &c. My going off the direct road was due to the information I got the evening before in Bangalore. I was told to make for Bowringpet then for Jalarpet and from there, *via* the Rice Causeway, to Madras. I am afraid I cannot give very detailed information as to the condition of the road surface. To the best of my recollection it was like the famous Curate's egg, good in parts. The only stretch that impressed itself very particularly on my mind (and body) as I was then very tired and stiff, was about 3 miles through Poonamalle, just before reaching Madras. This was very rough and shook me up considerably. As I before wrote, I stayed a full half hour for tiffin somewhere about half-way and lost another 15 minutes at least by going wrong at Conjeveram, so the actual running time all out was 6¼ hours and I am given to understand that the road I followed added 20 miles to the direct run.

I understand that I ran some 236 miles which means an average all through of 36 miles an hour which considering traffic, cattle, &c., is fairly good going. It also speaks well for the machine which had previously done 7500 miles, had only been down 3 times for cleaning, &c., and was in no way tuned up, or specially prepared for the run. The tyres were the original ones bought with the machine, extra heavy Dunlop's. I used just over 3½ gallons petrol.

I shall be interested to hear of any other Motorist who does the run that I did under the same condition in better time. Mr. Scovell will probably know me better over my signature, especially as I, with Mr. Ernest Logan and others, was one of the Founder Members of the S. I. M. U. when Mr. Logan and I were at Nellikuppam together.

Yours faithfully,

ERNEST A. HUGHES.

P. S.—I may add that during the whole time I have had my Sunbeam I have experienced no trouble of any kind whatever although I have travelled continuously over very bad and hilly roads.

Letchmi,

High Range,

Travancore.

Coffee Leaf Disease.

Dear Sir,—I was pleased to read the informing letters of Dr. Leslie Coleman, Director of Agriculture, Mysore, and Mr. Leslie Andrewes, of Deepdene Estate, British East Africa. Their information and criticisms are very welcome, as my whole object in discussing the problem is to keep up an interest in it till some definite solution is arrived at.

Dr. Coleman's first contention is that it is not certain that Hemileia vastatrix is an indigenous disease, and he asks on what data my statement to the contrary is based. To begin with, I think it will be allowed as a fairly general axiom, that when a disease, more especially an external fungoid disease, is found on cultivated plants, the identical or a modified form of the same disease will usually be found on some wild plants of the same class or order. Acting on this theory I searched for the leaf disease in wild plants allied to Coffee, and during 1913-14 I discovered such infected plants in the jungles on the Malabar side of the Wynaad. Not being an expert botanist I was unable at the time to name the plants, though I had no doubt that they belonged to the Rubiaceous order. Since then I have hunted up various authorities on planting and botany, and I am satisfied that Hemileia vastatrix, or a very intimate form of this fungoid disease is prevalent in the jungles of the above-named district ; and if native reports are to be believed, it is fairly common in other parts of Southern India. Whether H. vastatrix is identical with, or a slightly modified form of, H. canthium and H. woodii, is for scientists to establish, but personally I could see no practical difference ; and I am in accord with such reliable authorities as Sir George Watt, and Mr. George Massee in concluding that all these leaf diseases are indigenous in every country where coffee grows, and that they can readily adapt themselves to hosts both wild and cultivated.

In 1908 Sir George Watt, in his Economic Products of India, first wrote on the assumption that H. canthii and H. woodii, which are found on wild plants, were the parent sources of H. vastatrix. He says that, "In India there are some six or seven species of canthium, fairly abundant wild plants in the coffee area, also a species of Vangueria, both in Canara and the Coffee tracts of Burma"; and he then goes on to say, "This fungoid disease appears to have been first observed in coffee in Ceylon about the year 1869, and in the South of India two years later. It has since appeared in Burma, China, Java, Sumatra, and the Phillippine Islands ; and been identified as being met with in the coffee districts of Africa (even at Victoria Nyanza), and probably wherever coffee is cultivated in the Old World."

George Massee in his Text Book of Plant Diseases, publishes in 1899, says : Hemileia canthii infests Campanulatum, a wild plant common to Ceylon and India, and the parasite on the leaves of this plant is so close to H. vastatrix, the coffee leaf disease, that it is doubtful whether the two parasites are not identical, the minute differences observable being due to difference of hosts. Again H. woodii, appears to be not uncommon on two small trees allied to coffee, *viz.*, Vangueria infausta, and Vangueria latifolia. The same parasite also occurs on the leaves of an unknown plant from Natal. "This parasite again is so close to that of the coffee leaf disease that it is almost certain, opportunity afforded, the parasite would pass from one to the other." Further, in Massee's Genus Hemileia, published in the Kew Bulletin 1906, he says, "It

is not at all necessary to assume that the coffee leaf disease has been imported along with the coffee plant from one country to another, taking into consideration the wide distribution of different species of plants attacked by H. vastatrix and H. wocdii, both of which are capable of infecting species of coffee."

The three forms of Hemileia it is now shown are to be found alongside each other in Java, Sumatra, Africa, Burma, China, Phillippine Islands, Ceylon and India; and Watt and Massee are both of opinion that they are identical. and the latter goes further and states that they were not imported with Coffee from one country to the other. Therefore we must conclude that these diseases are indigenous in all the countries named, and there appears to be very little ground for disbelieving that coffee is infected by the wild form of the Hemileia disease. It now rests with scientists to work out the life history of the various Hemileia in Southern India, and finally either disprove or establish the connection between them.

As regards bad cultivation and loss of vitality being primary causes of the spread of leaf disease, I will reserve my data in support of the above contention. for my next communication, as I feel I have already trespassed on more than my fair share of space in this week's *Chronicle*.

Ootacamund. J. B. LESLIE-ROGERS.
2nd October, 1916.

Kulhutty Estate,
Santaveri, *via* Birur,
8-10-16.

THE EDITOR,

Planters' Chronicle,

Bangalore.

Dear Sir,—As there has been much written and said lately about spraying with Bordeaux Mixture for Leaf Disease, I might mention that I began spraying my this year's supplies with Bordeaux Mixture as some of them were showing signs of L. D. Since the spraying, I have noticed that the spots have all turned brown, like burnt paper and there are no more fresh signs of the disease.

To obtain good results, one must be most particular about using fresh unslaked lime, without which spraying is almost useless. Those, who years ago sprayed and found no good results, most probably were not particular enough about the Lime and the making up of their mixture.

Some large trees which I sprayed last year in November appear to have much more foliage than they ever had before.

I think spraying is well worth a fair trial, and I am sure, if it is done properly it will repay one for all the trouble and expense.

Yours faithfully,

SAM J. WILSON.

The Planters' Chronicle.

RECOGNISED AS THE OFFICIAL ORGAN OF THE U. P. A. S. I., INCORPORATED.

(Secretary's Registered Telegraphic Address "Planting," Bangalore.)

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THE U. P. A. S. I.

(INCORPORATED.)

Contents.

The Secretary has returned from the Meeting of the Labour Department at Ooty which was well attended—eighteen subscribers (including the Control Committee) were present. The Secretary will not be absent again from Headquarters until the end of November when he will be going to attend a Rubber Growers' Association Committee Meeting at Cochin.

The Director of the Labour Department who has been on tour returns to Bangalore on the 27th instant.

The Scientific Department publishes an article containing notes on the Pest Act in Ceylon, the Effect of Vacuum Drying on Crepe Rubber and the Colour of Flowers.

We publish the proceedings of a Meeting of the Wynaad Planters' Association, those of a General Meeting of the South Mysore Planters' Association and the first part of the Annual General Meeting of the Shevaroy Planters' Association—the second half will be continued next week.

We have received through the courtesy of the Private Secretary to His Excellency the Governor of Madras, nicely bound volume giving an account of His Excellency's tour in the High Range and Travancore, from which we hope beneficial results will come to the planters of these Districts.

SOUTH INDIA PLANTERS' WAR FUND.

	Rs.	A.	P.
Amount previously acknowledged	52,307	4	8
Mr. W. H. G. Leahy	20	0	0
Mr. J. M. Wilkie	30	0	0
Mr. A. J. Wright	20	0	0
Mr. D. V. Crowe	7	8	0
Mr. A. C. Morrell	25	0	0
Mr. Aylmer Ff. Martin	25	0	0
Mr. Bernard Malcolm	50	0	0
Interest received to 30th June last	675	13	3
Total...	53,160	9	11

SCIENTIFIC DEPARTMENT, U. P. A. S. I.

The Pest Act in Ceylon.

The Ceylon Plant Protection Ordinance is no sinecure as is shown by the account in a recent issue of the *Times of Ceylon* of a prosecution under the Ordinance.

The Shot Hole Borer of Tea is a proclaimed pest, and a man who had failed to notify the presence of this pest on the estate of which he was in charge, and who, after being shown the disease by the Government Entomologist, sent away by rail infected plants was prosecuted and fined Rs. 100.

Legislation of this sort, which is rigorously enforced, is undoubtedly necessary if any particular widely spread disease is to be efficiently dealt with.

The Effect of Vacuum Drying on Crepe Rubber.

Mr. B. J. Eaton describes some experiments to test the effect of vacuum drying as compared with ordinary drying on the properties of crepe rubber in the *Agricultural Bulletin of the Federated Malay States* (*IV.* 7.)

A series of samples were prepared on two different estates and in each case the experiment was repeated on eight different days, the following samples being prepared in each series on each day :—

(*a*) Thin crepe dried at ordinary temperature in a drying room.

(*b*) Another portion of the above dried in a Passburg vacuum drier.

(*c*) A portion of (*b*) remachined after removal from the vacuum drier as is always done on estates when preparing vacuum dried rubber for the market.

Altogether 48 samples were prepared and these were vulcanised and tested. The results of the tests showed that all the samples had a very uniform rate of cure, the difference between the air-dried and vacuum dried samples on any one day being always within $\frac{1}{4}$ hour with the exception of one series where the difference is slightly greater.

The rate of cure, as is always the case with thin crepes machined on the day of or after coagulation, is slow being the extreme limit for plantation Para rubber coagulated with acetic acid. The uniformity in rate of cure was anticipated since thin crepe during air drying undergoes practically no change, the substance in the latex or serum to which variability in rate of cure is due, being practically reduced to a minimum.

The physical properties of the vulcanised rubber undergo no deterioration by vacuum drying. A few of the samples gave tensile properties equal to the best grades of plantation Para rubber, but the majority of the samples, like practically all estate samples of thin pale crepe, are inferior in quality to plantation sheet, smoked or unsmoked. The tensile strength, etc,, of thin pale crepe compared with sheet is almost always about 20 to 25 per cent. below that of sheet rubbers. This is attributed to the almost complete removal of the substances essential to vulcanisation, since the strength of such rubbers can be recovered by the replacement of these substances. Generally speaking, it is extremely doubtful whether the inferiority of thin crepe rubber is due to the macerating and tearing action *per se* on the creping machines.

Although no experiments have yet been carried out it is practically certain that if slab rubber allowed to mature for six days were subsequently creped and then vacuum dried, the rapidity of cure and tensile strength would be equal to the best qualities of air dried crepe prepared from slab.

The Colour of Flowers.

Who has not at some time or other speculated upon the colours of flowers and their wonderful range? How are the glowing colours of the Rose produced and what mysterious chemical processes are taking place to produce the gorgeously graded and mixed colours in the petals of the Indian Pink.?

Not very much is known about this subject and it presents most difficult problems for investigation bound up with complicated chemical reactions. Willstatter and Everest have recently published some results of their work on the subject, however, that begin to throw light into dark places. They have discovered that the familiar Cornflower of our gardens for instance, owes its delightful blue petals to the presence of a chemical substance known as anthocyanin, and this with its compounds are fairly common pigments in flowers generally. This substance produces different colours depending whether it is present as a free acid, or combined with potash, or in connection with a plant acid. In the first case it produces blue flowers, in the second violet flowers, and in the last red flowers. Each of these forms of this substance may undergo a chemical condensation known as isomerism technically, and in doing so become colourless, and it is suggested that such a change may produce white flowers, though this theory needs further proof.

In the case of the Rose anthocyanin is present, the same chemical substance which produces the blue of the Cornflower, yet *mirabile dictu*, the dream of the horticulturalist, a blue rose, has never yet been obtained. The variations of the colour in the petals of the Rose are dependent on the reaction of the cell sap, whether acid, neutral, or alkaline. The white and yellow roses be it noted in connection with what was said above, contain practically no anthocyanin. the rose-coloured ones only a little, while dark red roses are rich in acid-combined anthocyanin, the body which when combined with an alkali produces the blue of the Cornflower, from which it may be inferred that if the horticulturalist could so far alter nature as to grow a Rose with an alkaline cell sap he would be able to produce the long sought for blue Rose.

The investigators conclude, as a result of their work, that the wonderful variation in the colours of flowers depends on the formation of different anthocyanins in the plant or individual flowers, the varying amounts of colouring matter present, the reaction of the cell sap, and the admixture of yellow pigments. In red flowers the anthocyanins are combined with acids, in violet flowers they exist as neutral salts, and in blue flowers they are combined as alkalies or metallic salts. These are pure colours; when yellow pigments, of which a number have been isolated, are also present, the wondrous riot of colour with which we are familiar in flowers is produced.

RUDOLPH D. ANSTEAD,

Deputy Director of Agriculture, Planting Districts.

DISTRICT PLANTERS' ASSOCIATIONS

Wynaad Planters' Association.

Proceedings of a Meeting held at the Meppadi Club, on September 20th, 1916.

PRESENT.—Messrs. Blackham, T. S. Gillatt, D. H. McLeod, B. Malcolm, W. Morres, S. H. Powell, I. Stewart, N. C. Whitton and C. E. Abbott (Honorary Secretary). *Visitor*—Mr. Lobban.

Mr. Malcolm in the Chair.

2252. THE PROCEEDINGS OF LAST MEETING.—Were confirmed.

2253. THE LATE MR. CHRISTIE.—The Meeting passed a vote of regret at the news of the death of Mr. John Christie, Managing Director of Messrs. Peirce, Leslie & Co., Ltd. and of sympathy with his relatives.

2254. LIEUTENANT ROBINSON, V. C.—The Honorary Secretary was instructed to write through the Coorg Planters' Association to congratulate the relatives of Lieutenant Robinson on his splendid exploit. It was re-called that it was the Coorg Delegate who proposed the starting of the U. P. A. S. I. Aeroplane Fund at the 1915 Meeting.

2255. POSTAL AND TELEGRAPH MATTERS.—Read Correspondence. The following resolution was proposed by Mr. Whitton, seconded by Mr. Gillatt and carried unanimously :—

"That this Association desires to draw the attention of the Director-"General of Posts and Telegraphs (1) to our request for the restoration of "the former hours of closing at the Meppadi Post Office, (2) to the opening "of the Sultan's Battery Office for Telegrams, (3) to the restoration of the "Meppadi-Cherambadi telegraphic connection."

NOTE.—Orders have, it is understood, been given subsequent to the Meeting for the Cherambadi-Meppadi link to be restored.

2256. TIMBER TRAFFIC.—Read memorandum from the President, District Board, on this subject.

Resolved. (1) That the Association agrees with the proposed rules, but suggests that the length of the logs mentioned in the President's memorandum para 3, should, if possible, be less than 24 ft. The Association also considers that, to make the rules effective, the registration of all vehicles is an absolute necessity.

(2) The Association wishes to thank the President for temporarily closing the Tambracherry Ghaut Road to Timber Traffic.

2257. LABOUR LAW.—Read letter from the Hon'ble Mr. E. F. Barber and connected correspondence. Resolved that the Meeting agrees with what Mr. Barber has written and calls attention to its resolution passed at the March Meeting (para 2229).

"That this Association approves of the Honorary Secretary's letter "to the Collector of Malabar. The Association considers that section 35 is "a vital one, and that no case has been made out for its amendment. It "considers that it is a decided deterrent to deliberate fraudulent breach of "contract and that it has not been misused."

2258. U.P.A.S.I LABOUR DEPARTMENT CONTROL COMMITTEE.—The Honorary Secretary informed the Meeting that the Committee had agreed to allow any Association that wished to send a delegate, who must be a subscriber to the Committee Meetings. Resolved that it is not considered necessary to send another Delegate at present.

It was announced that Mr. Martin, the Director of the Department, intends to visit Wynaad in October. Resolved that the Association would welcome a visit from him.

2259. ATTESTING CONTRACTS IN MYSORE.—With regard to complaints that certain Postmasters in Mysore had refused to attest coolies' contracts, it is noted that they have been cautioned.

2260.—POODAPADY HOTEL.—Read letter from C. Chungren. Resolved that the Association pay a further grant of Rs. 50 for this year. Mr. Gillatt kindly consented to visit the hotel from time to time and report to the Association what repairs are necessary.

2261. BANGALORE MEETING.—Mr. Abbott read his report, and was accorded a vote of thanks for his services.

2262. THE DEPUTY DIRECTOR OF AGRICULTURE.—Mr. Anstead will visit Wynaad in November and hopes to be accompanied by Mr. McRae the Government Mycologist. The Honorary Secretary was instructed to arrange the details of the tour in communication with Mr. Anstead. Members are requested to write to the Honorary Secretary.

2263. DISPENSARIES AND HOSPITALS.—Read letter from the Collector of Malabar asking for certain information about the number of dispensaries and hospitals maintained by Planters in Malabar Wynaad, the staff and their medical qualifications, the sick rate and death rate among estate coolies, giving the figures for each estate if possible. The Honorary Secretary was instructed to ask Dr. Milton and Mr. Malcolm to furnish the information.

2264. NEW MEMBER.—Mr. E. Lobban was proposed as a member of the Association by Mr. Malcolm and seconded by Mr. Abbott. He will be ballotted for at the next Meeting.

(Signed) B. MALCOLM,
Chairman.
(„) C. E. ABBOTT,
Honorary Secretary.

Note.—The next Meeting will be held on October 25th when it is expected Mr. Martin will be present.

It is proposed to hold the November Meeting on the 22nd, subject to any change in Mr. Anstead's plans.

The usual notices will be issued in both cases.

South Mysore Planters' Association.

Proceedings of a General Meeting held at the Travellers' Bungalow, Saklaspur, 21st September, 1916.

PRESENT.—C. Lake (President), C. J. Hayward (Vice-President), St. John Hunt (Honorary Secretary), J. G. H. Crawford, F. M. Hamilton, W. Galiffe, P. F. X. Saldanha, Thiselton Anderson, H. F. Anderson, E. W. Rutherford, E. V. Hunt. *Visitor.*—A Durham.

Minutes of the last Meeting held on 1st July were passed.

REPORT OF DELEGATES TO THE ANNUAL MEETING OF THE U.P.A.S.I. —Mr. C. Lake spoke as follows:—

Gentlemen,—According to your instructions I attended the Annual General Meeting of the United Planters' Association in Bangalore on August 14th, 15th, 16th and 17th last.

All the District Associations were represented, there being 19 Delegates present.

Among the Visitors present at the Meeting we had the pleasure of welcoming the Hon'ble Mr. H. V. Cobb, C.S.I., C.I.E., Resident in Mysore, Sir Thomas Holland, K.C.I.E., Chairman of the Commission of Industries, Sir M. Visvesvaraya, K.C.I.E., Dewan of Mysore, Mr. G. A. D. Stuart, Acting Director of Agriculture, Madras, Mr. Richards, Engineer-in-Chief of Mysore and West Coast Railways, Dr. Coleman and many others.

As you are aware a new method of conducting the Meeting was inaugurated this year. Committees were formed to discuss the various subjects on the Agenda during the first three days, the General Meeting of the U. P. A. S. I. being held on Thursday 17th on which day all the resolutions were passed.

This method is undoubtedly an improvement on the old one. Delegates arrive at a better understanding of all the subjects before them in Committee and much time and fruitless discussion is saved in open Meeting.

You will have read in the press full reports of all that occurred in open Meeting and I strongly advise all members to obtain and read a copy of the Book of Proceedings which will contain much interesting matter. This subject of the Book of Proceedings is on the Agenda to-day and I shall have more to say about it later.

I will now touch upon those matters which more directly concern this Association and coffee in general.

SCIENTIFIC DEPARTMENT.—The reorganisation of this Department under the Agricultural Department of the Government of Madras is progressing satisfactorily. The sites of the Tea and Rubber Experimental Stations have already been chosen and it only remains for us to fix upon the site for the Coffee Experimental Station and this should be done without further delay to enable the buildings on it to be erected during the coming dry season. This subject will, I believe, come up before you to-day.

IMPORT DUTY ON COFFEE.—The Coorg Delegates brought this matter forward and I supported the resolution.

PLANTERS' BENEVOLENT FUND.—Rule 9 has been amended and now includes the following words "any Subscriber on payment of the difference between Rs. 200 and such sum as he may have already subscribed to the Fund will be welcome as a Patron, etc., etc."

I hope that this will appeal to those among you who are annual Subscribers and that all who are able to do so will make up the difference and so become Patrons of the Fund.

PLANTERS' CHRONICLE.—The present design for the cover of this paper not being considered satisfactory the meeting decided to call upon members of the Planting Community for a more suitable one. I hope those who are artists among you will see if they can design a more suitable cover for this periodical.

THE ARSIKERE-MANGALORE RAILWAY.—I proposed the resolution on this subject and North Mysore seconded it.

You will have read what Mr. Richards said on the subject of Railway communication with the West Coast. The idea of having a number of new schemes added to the two already taken up by the U. P. A. S. I. did not commend itself to the meeting which gave its unanimous support to our resolution.

Mr. Richards has, since the meeting, visited Mangalore and will now be in a better position to judge of the merits of this scheme as against the alternative ones put forward by him.

KALISYNDIKAT MANURIAL EXPERIMENTAL FUND.—There seems to be a slight misunderstanding among some of our members about the resolution passed on this Fund.

It does not mean that the Experimental Plots are not to be carried on when it becomes possible to obtain potash again but that the Fund is to be absorbed into the general Fund of the Scientific Department thereby getting rid of the objectionable German name. The money for carrying on the Experiments is still available for the purpose.

Mr. Nicolls was elected Chairman this year and I feel sure the affairs of the U. P. A. S. I. could not be in better hands.

In conclusion, Gentlemen, I thank you for the honor you did me in electing me as your Delegate.

A hearty vote of thanks was accorded Mr. Lake for the efficient manner in which he had represented the Association.

INSTRUCTIONS TO "DASSERA ASSEMBLY" DELEGATE.—Mr. C. J. Hayward, the Delegate, was instructed to represent the following matters: Assistant Scientific Department, Land Tenure after the original holding of thirty years has expired, Madras Planters' Labour Act in Mysore, Roads and Communications, Payment of taxes by cheque.

MADRAS PLANTERS' LABOUR ACT IN MYSORE.—This important matter was thoroughly discussed and it was finally resolved, "that although in 1913 we *were* in favor of the introduction of Act I of 1903 with certain alterations to suit the planters of Mysore, we do not now think that the Act is likely to be of benefit to our community. We have at considerable expense joined the Labour Department of the U. P. A. S. I. and we hope that with its assistance we shall be able to do without many appeals to the Criminal Courts, and possibly acquire many of the benefits which Act 1 might confer." The above, proposed by Mr. F. M. Hamilton and seconded by Mr. J. G. H. Crawford was carried.

ASSISTANT SCIENTIFIC OFFICER.—As soon as the Council have definite information in regard to the recent proposals and developments, the outcome thereof will be intimated to members by circular.

SANDERSON WARD STORE.—With regard to this necessary addition to the Sanderson Ward, for which funds are required, it was proposed by Mr. C. J. Hayward and seconded by Mr. H. F. Anderson: "that as funds of this Association do not permit of subscribing to this at once, a donation of Rs. 250 will be provided for out of next year's Budget."

MOTOR TRANSPORT OF MAILS FROM CHICKMAGLUR TO MUDIGERE.—With reference to the resolution passed by the Kadur and Hassan Motor Association in connection with the above, it is noted with satisfaction that the mails *are* conveyed by Motor and we hope this may continue.

ST. GEORGE'S HOMES.—Mr. Lake spoke as follows in regard to this institution :—

Gentlemen,—I have ventured to put this subject on the Agenda to-day as it seems to me to be the kind of thing that ought to appeal to us very strongly as Europeans living in this country.

These Homes have been started at Kodaikanal for the purpose of re-claiming destitute children of European and Eurasian parentage many of whom exist in the towns of Southern India.

You will have read the eloquent appeal made by Mr. Breeden on behalf of these Homes at the recent meeting of the U. P. A. S. I. which was responded to liberally by every one present.

These children, who are at present being dragged up in the bazaars and who would otherwise later on lead useless and perhaps vicious lives are being given good Homes in a healthy climate where they are brought up to work for themselves, are educated and finally sent out into the World, to the Army or Navy perhaps or some other walk in life.

In fact, these Homes are being run on the same lines as the Kalimpong Homes in Northern India.

In subscribing to an institution of this sort we should not look upon it as a charity but rather as an investment in the future welfare of this country and of the Empire.

A resolution was passed on this subject at the U. P. A. S. I. Meeting in Bangalore last month which reads as follows :—

"That this Association do call the attention of District Planters' Associations to the urgent need of support required by the St. George's Homes and that all steps may be taken in order that they shall receive the fullest support of the Planting Community."

I have, therefore, gentlemen brought this matter before you to-day and trust that you will give it the support it deserves.

A subscription list was then circulated and resulted in Rs. 280 being collected in the room. The list will be further circulated amongst all members of the Association.

U. P. A. S. I. BOOK OF PROCEEDINGS.—Mr. Lake with regard to this matter made the following speech.

Gentlemen,—The proposition was carried by the U. P. A. S. I. in Bangalore last month on this subject was as follows :—

I beg to propose that all Delegates advise their local Associations to authorize their Secretaries to order a copy of the Yearly Book of Proceedings for every member and distribute them either free or recover the cost from their members as may be arranged.

It seems to me that District Associations, which are in a position to do so, should supply to their members all literature connected with the work done by the Parent Association. Whether we are in a position to supply all our members with a copy of the Book of Proceedings free of charge or not, I do not know, but if we are, I think, it should be done and that it would lead to more members taking an active interest in Association matters than is the case at present. I would like to ask our Honorary Secretary if he thinks that funds will permit of this being done.

It was finally proposed by Mr. Rutherford and seconded by Mr. E. V. Hunt that copies of the Book of Proceedings of the U. P. A. S. I. be ordered nd circulated by the Honorary Secretary to all members free of charge.—a *arried.*

CORRESPONDENCE AND SUNDRY ITEMS.—Mr. E. W. Rutherford was elected to go to Coorg as one of the Committee in connection with the Coffee Experimental Station.

Mr. E. V. Hunt was elected to attend the Labour Meeting at Ootacamund on the 16th proximo.

PARK-WOODBRIDGE'S CORRESPONDENCE.—This correspondence being laid before the meeting it supported the action of the Executive in the matter and is of opinion that the subscription guaranteed for 5 years by Mr. Park to the Assistant Scientific Officer Fund should be paid by him to that Fund for that period.

The Honorary Secretary was instructed to write to the Post Master General with regard to the great delay in delivery of the Mails in Saklaspur mainly caused by the Mail Jutkas being overloaded with passengers as many as seven persons having been seen.

The Honorary Secretary was instructed to forward the following resolution to Mr. Horace Robinson, Coorg. "Resolved that this Association congratulate Lieutenant Robinson, V. C. on his achievement in bringing down a Zeppelin and that copy of the Resolution be forwarded to his Father, Mr. Horace Robinson."

Mr. K. T. Seshaiya's letter was read to the meeting.

The Superintendent of Revenue Survey has agreed to notify the Secretaries of the 3 Mysore Associations as to when the Re-survey of taluqs in each district will take place.

With a vote of thanks to the Chair the meeting terminated.

(Signed) ST. JOHN HUNT,
Honorary Secretary.

Shevaroy Planters' Association.

Proceedings of the Annual General Meeting of the Shevaroy Planters' Association held at the Victoria Rooms, Yercaud, on 13th October, 1916.

PRESENT.—Revd. Father Capelle, Messrs. S. Campbell, E. Travers-Drapes, F. Carey (Chairman of the Yercaud Union), R. W. B. Gompertz, S. M. Hight, C. L. Hight, J. C. Large, W. Rahm, C. Rahm, C. K. Short, L. E. T. Short, V. S. Woodiviss, C. G. Lechler and Charles Dickins (Honorary Secretary). Also Mr. R. A. Gilby by his proxy Mr. C. Dickins. Mr. E. L. Poyser by his proxy Mr. S. M. Hight.

(1.) The notice calling the meeting was taken as read and the Honorary Secretary stated that he deemed it advisable to postpone the Annual General Meeting to this month as during the month of September two Committee Meetings had been held.

(2.) The Delegate (Mr. E. Travers-Drapes) read his report:—

Gentlemen.—I attended the meeting of the U. P. A. S. I, held at Bangalore on the 14th August and the 3 following days as your delegate. An innovation was made in the proceedings by forming committees to discuss the subjects brought forward by the delegates and only such resolutions as were approved of in Committee were placed in open meeting.

You have probably followed the proceedings as published in the papers but as some subjects which were brought forward in committee were not placed in open meeting, I would ask you to read the Book of Proceedings which contains all the discussion. Delegates were asked to request their respective Associations to give each member a copy of the Book of Proceedings either free or on payment as they are useful books of reference and as such they will keep all members informed of what has taken place at past meetings, besides which they contain full reports of scientific and other lectures.

LABOUR DEPARTMENT.—It has been decided by the Executive Committee to invite a delegate from each District to attend their Quarterly Meeting to obtain suggestions and the opinions of subscribers.

Mr. Aylmer Martin referred to the desirability of reducing advances to an absolute minimum which caused some discussion and everyone was agreed that it was a fatal policy to increase the rate of advances and I think this subject might be taken up by our Association. I pointed out that it would not be of much use unless all District Associations combined in this matter and a rate of advances for each Labour District should be drawn up in such a manner that the amount of advances per cooly be higher or lower according to the distance of the planting district from the labour district taking into consideration such factors as the unhealthiness or inaccessibility of the former or of individual estates. The idea was agreed to in the abstract. Now it is for you, gentlemen, to say what you will do in this matter as undoubtedly it is a subject of primary importance.

The Rev. Mr. Breeden, the Principal of the St. George's Homes, Kodaikanal, gave us an account of the work that was being done in rescuing children of British descent from the bazaars of the large towns in S. India. If you have not read Mr. Breeden's speech on the papers I would earnestly urge you to read it in the Book of Proceedings and to lend your support to these Homes however small the amount may be which you can afford during these hard times. There is one point in his speech which will, I am sure, strike you forcibly and that is that we as Britishers cannot allow these little mites to wander about the bazaars and grow up loafers and a danger to the community without considerable loss of prestige in this country. We all know as Mr. Breeden pointed out how sacred the tie of kinship is regarded by the Indian and what can be the impression on their minds when they see children with British blood flowing in their veins allowed to wander neglected and uncared for in the bazaars and growing up amongst the worst surroundings and under the vilest of conditions. In the St. George's Homes, the only domestic servants they have are the sweepers, and the children are taught the dignity of labour by having to do everything for themselves so that they will grow up men and women who will be instead of loafers a credit to their community. Mr. Breeden asked us if it was surprising that an Anglo-Indian would not go to market to buy a loaf of bread or to school without a servant to carry his loaf or books, and pointed out that it was only the British blood or the Sahib showing through. He assured us that every case was

thoroughly investigated and the child's parentage traced before admission to the Homes was given and that no cases were admitted unless it was proved that the child was either pure British or more British than Indian. Mr. Breeden has asked me to try and arrange a tour for him on these Hills. He will not ask you for any money, but will only place the facts before you and leave it to you to decide whether you can help or not.

Gentlemen, if the demands upon your own pockets (and I know they are many at present) are as much as you can endure there is another way in which you can help this deserving cause and that is by recommending it to your friends. What is wanted of course for an institution of this sort is a settled income and if anyone can see their way to making a monthly subscription however small it will be very useful. I may mention that I am aware of a few instances where some writers on these hills are subscribing to these Homes. Finally you may perhaps like to know that the cost for maintaining one child is Rs.35 a month. This amount is a bit high because they have not yet got their own land and houses.

I would next draw your attention to the useful and interesting lectures given by Dr. Coleman and Mr. McRae also to Mr. Aylmer Martin's and Mr. Anstead's reports.

As regards the Scientific Department Mr. Stuart, the Director of Agriculture, said he expected to receive orders soon to put in hand the new scheme of experimental stations. He especially referred to the Analytical Branch of the Department and Delegates were asked to urge on the members of their respective Associations the necessity for supporting this branch by giving it work.

Delegates were also asked to urge upon members of their Associations the necessity for every Rubber Estate in S. India supporting the Rubber Growers' Association as they were doing a lot of good work which individual estates could not do.

Office Bearers for 1916-1917.—Mr. J. S. Nicolls (Nilgiris) was elected Chairman and Messrs. Tipping of Coorg and Abbott of Wynaad, Vice-Chairmen.

The Nilgiri Association brought up the following resolution which was adopted:—"That this meeting of the U.P.A.S.I. suggests an extension of a modified form of the Dharkast Rules to apply in addition to the Waste Land Rules to all planting districts and that the Supplemental Rules to be so extended as to allow larger areas (than 5 acres) being taken up under them." As this affects these Hills considerably I had the pleasure of seconding this resolution. As the rules stand at present, if a planter wants a block of Government land adjoining his estate he can either have it put up to auction when there is always the danger that some speculator may outbid him with the object of selling the land to the applicant at a profit or else the planter can apply for only 5 acres at a time. Under the Darkhast Rules the land will be valued by Government and sold to the applicant only if he cares to pay the price Government asks.

Alien Enemies.—I am sure that we are all of the same opinion as Mr. Nicolls when in a forcible speech he upheld the views of the *Madras Mail* and the Madras and Bengal Chambers of Commerce that the "Germans must be ostracised both morally and financially" and that we should do all in our power to prevent alien enemies landing in India after the war. The whole meeting was unanimous upon this point and agreed that every Britisher in India should join the British Empire Union.

MANURE PRICES.—Messrs. Parry and Co's agent who was present at the meeting was asked if they could not publish their prices of their manure in the *Planters' Chronicle* so that planters may know what they would have to pay for each unit but he regretted he could not do this. He however agreed to send a list of manures with prices at regular intervals to planters who would register their names with the Firms for this purpose.

ROADS.—According to instructions I brought forward the question of the Manjavadi Ghat road and its connection with the Salem-Glazebrook Road. As you are aware there was no time to get replies from some of the owners interested as to whether they would subscribe towards the expense which Government considered was a *sine qua non* before they would take up the work. I was therefore not in a position to do more than estimate the amount we could get together. I pointed out that it was hard to expect planters to contribute half the amount necessary, while practically all the roads on these Hills were made from Imperial funds and the Forest Department would derive just as much benefit from this road as the Planters. The Hon'ble Mr. Barber said that it would be better to wait till we could say definitely what contribution we could make before we approached Government on the subject and that after this was settled he would do what he could for us in the matter if it is sent up to him through our Association. After such a definite promise the best thing to do was to withdraw my resolution on the subject which I did. I have now a definite promise of a subscription of Rs 200 from Mr. Stanes and Mr. Pritchard has promised Rs.2 per acre which I think will come to Rs.180. Mr. Nicholson has addressed the Directors of the Company interested in the Vanguard Group of Estates and their decision will be communicated to you after which we can address the Hon'ble Mr. Barber.

ACT XIII OF 1859.—I was instructed to ask for an amendment to this Act for the purpose of enabling Magistrates convicting accused persons of breach of contract, passing an order for the return of Court fees. This I did but my resolution had to be withdrawn as everyone was against it because the Hon'ble Mr. Barber was of opinion that if we try to resurrect the dead in the shape of this old Act, Government are more than likely to lay the Ghost once for all by immediately removing this Act from the Statute Book and giving us Act I of 1903. Further the meeting seemed to be of opinion that Government are likely to give us Act I sooner or later whether we like it or not and that if we pressed the matter of Act XIII of 1859 it would be rather sooner than later.

If there is anything upon which any gentleman would like to ask any questions I shall be glad to reply to the best of my ability.

The following papers are laid on the table for information:—

(1) Budget of the U. P. A. S. I. for 1916-17.

(2) Report of the S. I. Planters' Benevolent Fund up to 31-12-15.

(3) Revenue and Expenditure Account of the U.P.A.S.I. for 1915-16.

It was proposed by Mr. S. M. Hight, seconded by Mr. J. C. Large and carried unanimously:—

"That the delegate's interesting report be printed and that a hearty "vote of thanks be accorded him for representing this Associa- "tion at the last U. P. A. S. I. Meeting."

(To be continued.)

The Planters' Chronicle.

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THE U. P. A. S. I.

(INCORPORATED.)

Contents.

Concluded in this issue are the Proceedings of the Annual General Meeting of the Shevaroy Planters' Association.

We publish our usual weekly article on Markets, Prices and Statistics.

Under the heading of Rubber we publish extracts from a Report of Mr. Lyne, the Director of Agriculture, Ceylon, on the results so far obtained by the Ceylon Rubber Research. Investigations have not been completed, but the most noteworthy results so far obtained are given. The whole article is interesting reading.

Our correspondence columns contain letters from Mr. Poyser who does not advocate the shading of clearings only with E. lithosperma if the rainfall is light. Doctor Leslie Coleman favours us with a few comments on Mr. Leslie Rogers' letter, which requires a specific answer, especially as to the microscopic examination of the disease.

Mr. Leslie Rogers writes a lengthy (none the less welcome on account of it) letter on Leaf Disease and Defective Cultivation.

Friends will be pleased to hear that G. W. Fulcher, late 2nd Lieutenant, 16th Lancers, now Lieutenant, 18th Bengal Lancers and his brother E. A. Fulcher, Lieutenant 14th Hussars, are both well in France, and are much interested in the list of planters who have joined His Majesty's Forces and that Mr. Gordon Brown, who enlisted, and was wounded, has received a commission.

We have been informed that the Indian Industrial Commission will probably arrive in Bangalore in the course of its tour on the morning of the 21st of February 1917 instant and remain four clear days.

SOUTH INDIA PLANTERS' WAR FUND.

	Rs.	A.	P.
Amount previously acknowledged	53,160	9	11
Mr. H. Waddington	30	0	0
Mr. R. H. Crowther	10	0	0
Messrs. Barber and Pascoe	75	0	0
The Teekoy Rubber Estate Ltd. £20 ...	300	0	0
Total...	53,575	9	11

DISTRICT PLANTERS' ASSOCIATIONS

Shevaroy Planters' Association.

Proceedings of the Annual General Meeting of the Shevaroy Planters' Association held at the Victoria Rooms, Yercaud, on 13th October, 1916.

(*Continued.*)

(3.) The Honorary Secretary read his report :—

Gentlemen.—It is customary for the Hon. Secretary to give a report at the Annual General Meeting of the work done by the Association during the year. I am afraid my report this year will be a very poor one, as very little business has passed through the Association during the year under review.

We commenced the year with 32 members and closed with 33 (an accession of 1,—Mr. E. Travers-Drapes).

The call to arms in defence of the British Empire has caused the Association the loss of 2 of its sporting members, Messrs. K. Leeming and E. Large, and I am sure I echo the sentiments of the Association when I say we wish them every success in their new duties and hope they will have the chance of winning distinction and honour. The vacancies caused by their departure were filled by Messrs. V. S. Woodiviss and C. L. Hight. The Grange Estate having changed hands Miss Gompertz resigned and her place was taken by Mr. R. W. B. Gompertz—the present owner of the Estate. Mr. G. Turner, having gone Home, he was represented on the Association by his visiting agent Mr. F. Carey.

The accounts have been through the hands of your auditors, Messrs. E. Travers-Drapes and C. Rahm, who were elected by you at the meeting of 5th July and I trust they will be able to certify to the correctness of the following statements :—

The income of the Association amounts to Rs. 1,582-0-2 and was collected as follows :—

Rs. 391-14-2 from last year's balance, Rs. 960 from 32 subscribers at Rs. 30 each. Rs. 80 from last year's outstanding, Rs. 20-2-0 from sale of bamboo permits, and Rs. 130 subscription to the P. B. F. Thus making the total equal to Rs.1,582-0-2.

The Expenditure is as follows :—

Office Establishment Rs. 204 (that is Clerk at Rs. 10 a month for 12 months and peon at Rs. 7 a month for 12 months) for printing various notices and circulars Rs. 8-14. Postage including wires and letters and Registered letters Rs. 15, purchase of 1 Book of Proceedings for 1915 Re 1. A map of the Shevaroys for the Director, Labour Department, in connection with the Madras Exhibition Rs.15. To the Forest Department on account of purchase of bamboo permits Rs.25 and 4 annas the V. P. P. Commission. Subscription to the U. P. A. S. I. on account of 4,915 acres at 2 annas per acre Rs. 614-6-0. Subscription to P. B. F. for 12 subscribers at Rs. 10 each Rs. 120 and 1 subscription for 1915 Rs. 10. Total Rs. 130. Delegates Expenses to Bangalore Rs. 100.

Thus leaving up the total of expenditure to Rs. 1,113-8-0 leaving a balance in hand of Rs. 468-8-2 of which Rs. 300 is with the Bank of Madras, Salem branch and Rs. 168-8-2 with me. The outstandings amount to Rs. 35 only and I have with me Bamboo permits to the value of Rs. 5-2-0 and grass permits to the value of Rs. 3-7-0. The outstandings, *viz.*, Rs. 35 as just stated are Rs. 30 due by one subscriber for this year and Rs. 5 is an old outstanding from 1914 due by a member who resigned the Association last year.

My sincere thanks are due to all members who have so promptly paid in their subscriptions this year, thereby better enabling me to bring the accounts up to date and without showing a large outstanding account.

During the year under review we had 8 meetings, *viz.* :—

On 24th September	1915.	The Annual General Meeting.
14th December	„	A Quarterly do.
22nd February	1916.	Special do.
2nd March	„	A Sub-Committee Meeting.
7th March	„	do. do.
11th April	„	A Quarterly General Meeting.
5th July	„	do. do. do.
10th August	„	A Committee Meeting

or in other words a meeting once in one and a half month which have all been fairly well attended.

Owing to complaints made regarding the unsuccessful working of the Special Preventive Police Force sent up to the Hills during crop time, the District Superintendent of Police invited the co-operation of the Association in the matter of drawing up a scheme for the more efficient and successful working of the Force. A Sub-Committee was appointed and a scheme drawn up at a meeting held on 2nd March. This was placed before the D. S. P. at a meeting held at Yercaud on 7th March, and with his professional knowledge and advice it underwent some slight alterations and additions and was eventually produced and approved of at the General meeting held on the 11th April and the Honorary Secretary was instructed to place the matter, together with certain resolutions, before the Government of Madras through the Collector and District Magistrate of Salem. Also to send copies of the correspondence, resolutions, and scheme to our Planting Member, the Hon'ble Mr. Barber. I have reasons to believe the scheme will be put into force as soon as suitable arrangements can be made. Our sincere thanks are due to Mr. Dawson, the D. S. P., for the considerable amount of keenness and interest he has shown in the matter.

The Sub-Committee meeting held on 22nd February, 1916 was convened for the purpose of discussing the Pest Act and Mr. Anstead's letter. It was resolved to accept the Act if Government on their part would make the Act applicable to all Government lands in the neighbourhood of Estates. I beg to draw your attention to the fact that the Planters' Benevolent Fund is not supported to the extent it should be by subscribers to the Association. At the recent U. P. A. S. I. meeting certain resolutions were passed affecting the existing rules of that Fund. These I have received from the Secretary and will have them printed and circulated to members, which I hope will be the means of bringing in an additional number of subscribers. The cause for which this Fund was started, is a worthy one, and I feel sure no appeal to the members of this Association will be in vain, when they come to seriously consider the great benefits that may be conferred on those who are deserving of help from the Fund.

I have received continuous appeals from the Secretary R. G. A. asking members of this Association who own rubber estates to join that Association. Information of this was sent to the owners but so far with no response. At the last U. P. A. S. I. meeting a resolution was passed pointing out that it was the duty of every rubber estate in Southern India to join the R. G. A. thus enabling that Association to enlarge its scope of utility and to undertake research work in Southern India. I was asked by the Secretary to inform you of this resolution and I have great pleasure in doing so and trust you will yet see your way of joining the R. G. A. thereby enhancing its influence.

It is with regret I have to mention that during the last crop season very few members sent in information to the Association with reference to the prices they sold their various grades of coffee in the local market thereby causing depreciation in an otherwise steady market. When dealing with local merchants it would be advisable for members to inform the Honorary Secretary of all sales to enable him to inform other members and thus keep up the tone of the market. This system—and a most commendable one—was organized some years ago by the Association and it is hoped that it will not be allowed to drop. The Committee and myself now place our resignation in your hands.

For the last 8 years I have had the honour of being your Honorary Secretary and feel sure you have had enough of me and that it is only your good nature that has prevented you from conferring the "Order of the boot" on me so I trust you will elect some younger member of the Association who will, I am sure, carry on your work in a far abler manner than what I have been able to do. I also take this opportunity to thank the Committee for their help during the past year.

It was proposed by Mr. S. Campbell, seconded by Mr. V. S. Woodiviss and carried unanimously:—

"That the Honorary Secretary's report be adopted and printed."

(4.) A Shevaroy Local Board (Taluk Board).

Read letter dated 28th August, 1916 from Mr. F. Carey (Chairman of the Yercaud Union) to Honorary Secretary, S. P. A. with reference to a scheme for the formation of a "Shevarov Local Board" with planters as Members in supersession of the Salem Taluk Board (as far as concerns the Shevaroy Hills in amalgamation with the Yercaud Union).

The Chairman of the Yercaud Union was present and discussed the matter to a considerable extent with those present and the following proposal was made by Mr. R. W. B. Gompertz, seconded by Mr. C. Rahm and carried unanimously:—

"That the Chairman of the Yercaud Union be requested to address "the President of the District Board asking for information as to "the working of the proposed *Taluk Board* with reference to "Income and Expenditure."

(5) Act 8 of 1857.—Read copy of memorandum No. 447 dated 8th September 1916 from the District Magistrate Salem to the Deputy Tahsildar, Yercaud, with reference to above Act and rules published in the G. O. 866 of 31-5-12, relating to estimate of coffee crop and form A.

The Honorary Secretary was instructed to address the Deputy Tahsildar with reference to the contents of memorandum at the same time asking him to kindly treat the matter as urgent, as the returns should reach the D. S. P. not later than 15th October.

(6) CLOSURE OF ARRACK SHOPS ON THE SHEVAROY HILLS.—Read letter No. 3879 dated 3rd October 1916 from E. W. Legh, Esq., Collector of Salem to Honorary Secretary, S. P. A. also copy of extract from the Assistant Commissioner's letter dated 26th September 1916.

The Honorary Secretary was instructed to thank Mr. Legh for his letter. With reference to the extract the following proposal was made by Mr. E. Travers-Drapes, seconded by Mr. S. M. Hight and carried unanimously:—

"That this Association considers the view of the Inspector of "Abkari—Salem Circle—that the Arrack shop keepers on the "Hills will prevent illicit distillation by giving information of "the same—is a very weak point—because without any Arrack "shops on these Hills, shop-keepers at the foot of the Hills "benefit thereby and therefore they will find it to their advant- "age to give information of illicit distillation or illicit sales on "the Hills. This Association further is of opinion that the "abolition of Arrack shops on these Hills this year has been of "great benefit to all concerned and if the consumption of foreign "liquor does increase, it means that the consumer has to go "further for his liquor and in the case of illicit sales, they are "cash transactions and not paid for from stolen coffee."

(7) AGREEMENT FORM. With reference to Act 13 of 1859 and in conjunction with the Association's deputation to the District Magistrate, Salem District, the following proposal was made by Mr. S. M. Hight, seconded by Mr. W. Rahm and unanimously carried:—

"That the Honorary Secretary be requested to obtain competent "advice from lawyers in Madras for the purpose of drawing up "Agreement Forms:—

"(1) Between Maistry and Employer.

" 2) Between Maistry and Cooly.

"(3) In the case of Contract Works."

(8) ST. GEORGE'S HOMES.—With reference to Mr. E. Travers-Drapes' touching appeal on behalf of the above Institution in his report, the hat was sent round and Rs. 96 collected and it was thought that those members who did not attend this meeting would also contribute something.

(9) The election of Honorary Secretary and Committee.

Result of the ballot:—CHARLES DICKINS, *Honorary Secretary*.

COMMITTEE.—Messrs. E. Travers Drapes, S. M. Hight, J. C. Large, E. L. Poyser, C. Rahm, W. Rahm, Revd. Father Capelle.

Mr. Charles Dickins thanked the Members for the honour they had done him in again electing him their Honorary Secretary and Chairman for the coming year.

At the termination of the meeting, Mr. V. S. Woodiviss, on behalf of the Members thanked the Honorary Secretary and his Committee for the trouble they had taken in administering Association affairs for the past year.

(Signed) CHARLES DICKINS,
Honorary Secretary.

MARKETS, PRICES, AND STATISTICS.

Coffee.

Brazil receipts to 30th September.

1916.	1915.	1914.	1913.
4,713,000	5,325,000	2,533,000	5,232,000

Offerings at auction have been :—

—	12—29 Sept.	Since 1st Jan.	Last year.
East India	Nil.	27,102	40,658
Costa Rica	706	93,982	98,652
Other Milds	2,796	64,421	142,854
Brazil	14,169	84,066	106,979
Robusta	102	1,453	13,222
B. E. A. & Uganda	1,584	11,124	10,360

Messrs. T.H. Allan & Co. report that the Coffee market remains very quiet, but in the absence of any pressure to sell prices are steady. The home trade buy a little from time to time and there has been some business doing for Russia, but the Archangel route is now closed and export in general is still practically impossible on account of the restrictions. There has been a little talk about East India crops "to arrive," but so far the possible buyers ask only for Coffee to France. It is difficult to get at their idea of value, but it is probably about 75—c. i. f. Marseilles. It was expected that New York would support the terme market, but such has not been the case, and prices have lost the ground they gained early in September.

The Mysore Chamber of Commerce Weekly Report dated 23rd October states that quotations are more or less nominal and that there is no demand. Price per maund of 26½ lbs: Peaberry ranges from Rs.14 to Rs.16; Parchment, Rs.11/8; Native, Rs 10/4. Chickmaglur quotes Peaberry, Rs.14 to 14/8; Native No. 1, Rs. 11 to Rs.11/8; Native No. 2 Rs.10 per maund of 28 lbs.

Tea.

Tea has met with a slow demand and prices generally have been easier, especially for medium and common grades. The following prices have been obtained for South Indian Tea at the sales held on 25th and 27th September and 2nd and 4th October :—

—	B.O.P.	O. P.	B. P.	Pek.	P. S.	P. F.	Dust.	Fgs.
TRAVANCORE.								
Mount ...	11	9½	10½	9½	9	...	...	...
Kolie Kanum ...	11	...	10	9	...	...	...	...
Pambanar ...	...	...	10	9	...	...	...	...
Penshurst ...	11¼	...	10¼	9	8¾	...	...	...
Kolam ...	...	...	9¼	8½	8	...	8½	9
Vembenard ...	10¾	...	10	9	8½	...	...	...

—	B.O.P.	O. P.	B. P.	Pek.	P. S.	P. F.	Dust.	Fgs.
TRAVANCORE.								
Munaar ...	10¾*	...	10¾	10	9½	...	...	...
Chokanad ...	10½*	...	10¼*	9¾	9¼	10	...	10¼
Glenmary ...	11¼	...	10	9¼	...	...	...	...
Periavurrai ...	10½*	...	10½	...	9¼	10¾	...	...
Stagbrook ...	10	...	9¾	9	...	...	...	...
Sevenmullay ...	11¾	10¼	10¾	9¾	...	...	...	...
Fairfield ...	...	...	9¾	9¼	8¾	9¾	...	...
NILGIRIS.								
Prospect ...	14¾	11	10¾	10½	...	...	...	...
Richmond ...	9½	9¼	9	9	...	...	...	9¼
Cherakara ...	...	9½	9¾	9	9	...	...	...
	...	9¼	9¾	9	8⅔	...	...	1¼
Daverashola ...	...	10¼	10½	9¾	...	...	...	...
Wentworth ...	10	9¼	...	9¼	8¾	...	8¼*	...
Nonsuch ...	11½	11	...	10½	...	...	...	...
Barwood ...	10	...	...	9	...	...	...	...
Rob Roy ...	11	10½	10¼	10	...	...	...	...
WYNAAD.								
Chulika ...	9¾	...	9¼	...	...	...	...	...
Erramaculla ...	10	...	9¾	9½	9	9½	...	...
Askem ...	10½	...	...	9½	9¼	9¾	...	...

*Withdrawn from sale.

Shipments from Northern India for the first half of September showed a decline of 4½ million pounds, and the total shipments of this season's crop is 7½ million pounds less than last year.

The stock of Java tea on hand in the bonded warehouses at Amsterdam on January 1, 1915, was 9,610 chests. There were imported during the year, 219,382 chests, making a total of 228,992 chests, of which 99,958 chests were purchased by Netherlands firms for domestic consumption, and 111,729 chests by foreign buyers, leaving 17,305 chests on hand December 31, 1915. This is reported to consist largely of "dust," "pouchon," "fannings," and similar kinds, which formerly were in demand in England, but could not be shipped there owing to export restrictions.

There has been a steady increase in the consumption of Java tea in the Netherlands during the past 15 years.

Of Sumatra tea, 1,611 chests were imported during 1915, against 50 chests in 1914. There were no imports during the past year of China tea, of which 96 chests were received in 1914.

According to statistics furnished by the Amsterdam customs authorities, the total imports of all kinds of tea during 1915 amounted to 27,764,400 pounds and exports to 21,586,400 pounds.

Rubber.

Messrs. T. H. Allan & Co. report that after a short period of activity during which crepe touched 2/6 and smoked sheet 2/5½, the market became quiet again and prices receded about 2¼*d*, but then recovered to 2/4¼ and 2/4. On 5th October they were firm at 2/4¾ and 3/4¼.

R. D. A.

RUBBER.

Ceylon Rubber Research.

The Planting Gazette (*IV.* 8) publishes a report by Mr. Lyne, the Director of Agriculture, on the results so far obtained by the Ceylon Rubber Research. In the *Report of the Department of Agriculture* for 1915 it is explained that these experiments are being carried on in conjunction with a group of plantations and the Imperial Institute in London, an arrangement which secures the confidence of planters, and ensures the advantage of independent investigation at home under conditions similar to those experienced by British manufacturers, with whom the Imperial Institute keeps in touch. The samples of rubber destined for vulcanization by the Imperial Institute have been prepared by Mr. L. E. Campbell, Rubber Research Chemist, those intended for direct comparative tests being made from bulked latex collected in one day from reserved trees. In experiments of this nature uniformity of preparation is a very necessary condition if all suspicion of subsidiary influences is to be eliminated and this condition has, in the case of our rubber research work, been fulfilled. Mr. Campbell worked through a scheme of preparation designed to cover the whole of plantation practice in the manufacture of thick and thin crepe, smoked sheet, and block. It included preparation by acetic acid and other coagulants in varying strength and degrees of temperature; the effect of formalin and other re-agents for retarding coagulation; and rubber from old and young trees. 360 samples in all have been prepared, and reports received on 140 of these.

The results as far as they have gone, are set out by Mr. Campbell in his report. They go to show that, as to the main features, there is not much the matter with plantation practice. Acetic acid is about the best coagulant that could be used. The quantity necessary varies according to the quality of latex, the limits in Ceylon, being from 1 part of pure acid to 600 parts of pure latex, in exceptional cases to 1 in 900, the usual proportion required being about 1 to 800. Every factory should possess glass measuring vessels, in order that the acid may be added accurately and stock solutions made.

The work of investigation undertaken has not as yet been completed but the most noteworthy results so far obtained are the following :—

" 1. Acetic Acid is on the whole the best coagulant that can be used at present.

" 2. Latex allowed to coagulate naturally, without the addition of any coagulant, yields rubber of good quality.

" 3. Rubber allowed to remain wet after coagulation (creosote having been added as a preservative) is quick curing and strong.

" 4. Washing dry rubber on its arrival in London does not effect the quality.

" 5. The addition of creosote does not affect the quality.

" 6. Crepe takes longer to cure (vulcanize) than plain sheet.

" 7. Smoked sheet takes longer to cure than plain sheet : thus smoking retards curing.

" 8. Plain sheet is often stronger than crepe, and, in some cases, than smoked sheet.

" 9. Smoking would appear in certain cases to affect adversely the strength of the rubber (smoked sheet), but final conclusions as to this cannot be drawn till samples now under examination have been tested.

" 10. Repeatedly passing crepe through rollers does not injure it.

"11. There is little or no difference between thin crepe and thick crepe prepared from dry thin crepe.

"12. It is a matter of indifference, as far as quality goes, whether crepe is air-dried, or dried in hot air or in vacuo.

"13. Making dry rubber into block or roll does not appreciably affect the quality or rate of cure."

Wintering Trees.

"In Ceylon, Rubber trees are generally rested at leaf fall, but the probabilities seemed to be that, regarded from the point of view of the welfare of the trees, spring was the proper time to rest them. Our investigations have shown this to be the case; as it is when leaf is being renewed in spring that the food reserves of the tree are most heavily drawn upon by nature. No depletion of starch cells occurs at leaf fall. The call upon the food reserves of the tree is most severe during the production of new leaves."

The "Descending Increment."

"What may be called the "descending increment," that is, the increase in the flow of latex and resulting weight of dry rubber as the tapping cut descends the tree, has been explained by the discovery of the fact that the rows of latex vessels increase in number as we descend the tree, and that this increase has no direct relation to the increase in girth. In some cases the number at ground level was nearly double that at a height of two feet. From there upwards the rows decrease, but not to the same extent. These discoveries not only explain a circumstance of which many planters were aware, but may possibly lead to modifications in tapping which are as yet not contemplated."

Time of Cure (Vulcanization.)

"This is of great importance to a manufacturer, because the best results are only obtained when the cure is perfect. Rubber that is over or under cured will result in inferior quality goods. Large manufacturers make their own preliminary tests to guide them, but small manufacturers are often unable to do this owing to a lack of a scientific staff and special plant.

"Our samples are, as has been stated, vulcanized at the Imperial Institute. So far, the time required for vulcanising them bas varied from 38 to 140 minutes. This reveals with regard to plantation rubbers a very great factor of uncertainty, which we may, as a result of these investigations, he able to some extent control."

Strength of Rubber.

"The diversity in prevailing systems of preparation does not affect the strength of the vulcanized product to the same extent as it does the time of vulcanization. Of 207 specimens, 120 withstood a strain of 2,300 lb. per square inch, and 62 of 2,400 lb. and over. The breaking strains of two samples of Best Hard Fine Para, tested for comparison, were 2,276 lb. and 2,312 lb. per square inch, respectively."

Effects of Tapping on Trees.

"It was at one time believed that tapping had the effect of withdrawing food reserves (starch) from remote parts of the tree, for example, from the roots, and that in the course of time we might be faced with serious debility in the trees as a consequence. Our investigations have shown that the depletion of starch cells is usually very local, and that no such apprehensions need be felt. At the same time, the evidence with regard to bark renewal is in favour of a small number of tapping cuts and careful and moderate tapping."

CORRESPONDENCE.

Bonaventure Estate,
Nagalur, P. O.
Shevaroy Hills.

THE EDITOR,
Planters' Chronicle.

Sir,—I have read the letter written by "Sophos" in your issue of the 7th instant with much interest and feel sure that most planters with experience will agree with its contents. The remarks however regarding *Erythrina lithosperma* as a shade tree, true as they are with regard to a large part of coffee-planted land of South India, do not apply to the whole of it. Given a heavy rainfall and suitable elevation this tree gives back to the soil more plant food, probably, than any other suitable for coffee shade, but I have found it is not suitable as the chief shade, or in my opinion even as a permanent shade, on my Estate at any rate. The rainfall varies from 50 to 55 inches a year and I have *E. lithosperma*, grown from stumps, planted from about 2900 to 4300 feet above sea level. Generally speaking the lower the elevation the better the stumps have come on though some trees have branched out fairly well in a stump rot patch at about 4100 where the soil is of very good quality. Yet stumps planted two and a half years ago do not afford as much shade to-day as an average stump of six months growth planted, for example, on the west of Mysore tableland would do. The leaves are small and mostly of a yellowish green, branches are stunted in growth, and, far from behaving in a semi-deciduous way, they drop every leaf when the trees blossom as a rule. Besides this a large percentage of stumps planted at the higher elevations fail to shoot at all.

For these reasons, I think it would be extremely inadvisable to shade clearings only with *E. lithosperma* if the rainfall is light and especially if the elevation approaches 4000 feet or more.

Yours faithfully,
E. L. POYSER.

No. 774/Mis. Office of the Director of Agriculture in Mysore,
Bangalore, dated October 19th, 1916.

Dear Sir,—With reference to Mr. Leslie Rogers' lettter in your Journal of the 14th instant, I am afraid that his general axiom with regard to the occurrence of specific plant diseases simultaneously on wild and cultivated plants in a particular locality would not be accepted by any Mycologist. It is a pity that Mr. Rogers did not send the specimens of infected plants which he found in the Wynaad to an expert for identification of the fungus. He does not say whether he made a microscopic examination of the disease and if he did not do so it is more than probable that the leaf disease which he found was in no way related to the disease of coffee. The number of

leaf diseases on uncultivated trees and shrubs in India is very great and many of them are quite indistinguishable from one another to the naked eye although they may be caused by quite distinct fungi. Native reports with regard to such a subject as leaf diseases are about the most untrustworthy sources of information that could possibly be imagined.

Mr. Rogers is also not very fortunate in the authors he quotes. Sir George Watt could hardly be called a reliable authority with regard to plant diseases while Mr. Massee's studies of coffee leaf disease, conducted as they had to be on dried material sent to Kew, could only be of a very imperfect character. I am afraid therefore that conclusions based on the authority of these two authors can hardly be accepted. The only way to find out whether the fungi are identical is by cross inoculation—work which will be taken up immediately.

I have already received from planter friends a number of specimens of jungle trees attacked by leaf diseases and should be extremely glad to receive others.

Yours faithfully,

LESLIE C. COLEMAN,

Director of Agriculture.

THE EDITOR,

Planters' Chronicle.

Leaf Disease and Defective Cultivation.

Dear Sir,—In continuation of my last letter, I will here try to meet those who object to my stating that loss of vitality is the cause of leaf disease in Coffee. In originally using the word "cause" I, of course, did not mean that loss of vitality actually created or spontaneously generated the spores of H. vastatrix. I meant what is now admitted, namely, that loss of vitality is a "predisposing factor," and I may further add, the chief factor in attracting and spreading the disease. It is because of this conviction that I advocated the necessity of first disposing of this salient factor, before discussions were held on how to apply external measures to merely check the diseases. It will be allowed that to discover the initial cause of any disease it is desirable to begin the search by eliminating, one by one, all the likely factors that lead to that disease; and until faulty and insufficient cultivation, which results in loss of vitality, is not eliminated as one of the possible sources of disease production, all arguments against my thesis stand non-proven. Personally I am convinced after close study of both tea and coffee for over a quarter of a century, that the absence of proper cultivation in its broad sense, is the prime factor and chief source of most of our plantation troubles. A stable equilibrium must be maintained between the crop production and the natural recuperative powers of the plant. When this equilibrium is disturbed by artificial forced production, in the absence of good tillage, soil aeration, and continuous fresh root-nutriment, the plant must prematurely decline in vitality, and die out from some form of disease as a result of exhaustion. What happens, for instance, in an abandoned coffee estate? In a few words, a rapid decline

in vigour and productiveness, and an early and entire extinction within a very few years. This is so chiefly for two reasons, namely the sudden cessation of soil aeration, and the exhaustion of the food supply within reach of the coffee roots, hastened in addition by the drain on the same supply by the extension of gross surface feeding roots of unsuitable jungle trees. There is generally a superabundance of natural mulch in such places, but it has never yet helped to save the coffee. Of course, there are other contributory causes at work at the same time, but none are so potent in extermination as those I have mentioned. In such abandoned plots, as soon as the coffee begins to decline in vitality, there will nearly always be found all the afflictions to which the plant is liable, *viz.*, root rot, black rot, borer, grub, and others, as well as our much discussed friend Hemileia vastatrix. Experiments have been tried on diseased coffee, of only carrying out the ordinary operations of pruning, handling, shading, weeding, etc., but doing no ground cultivation whatever, and it was found that in a comparatively short time the plants declined in vitality and production and steadily proceeded in this direction till death followed eventually from exhaustion and disease. While a neighbouring plot treated in an exactly similar way, but with the addition of good tillage and soil aeration, continued in spite of some disease to flourish and produce normal crops. From the above does it not obviously follow that good progressive cultivation is this prime factor in coffee management, without which all other processes are of secondary, and comparatively little value ? Does it not also follow that absence of cultivation causes decline in vitality, and exhaustion of both plant and soil, which in their turn induce disease. It has been argued against me that healthy as well as debilitated plants are affected by leaf disease. Of course, if Hemileia spores are floating around, such will be the case, when all are living in the same environment and under similar conditions; but there is just this difference, all other things being equal, that the healthy plants not only recover sooner, but continue a vigorous existence, while their unhealthy neighbours, if cured at all, are still liable to a repetition of the disease, and are thus eventually killed out. I have no wish to dogmatise and lay down abstract theories. Many others must have had the same experiences as myself. All I have done is to make observations and carry out experiments, which have perforce compelled me to come to certain conclusions, and in these conclusions I am fortunate in finding support in many authorities on coffee management as the following excerpts will show:—

Fergusson's "Coffee Planters' Manual for Ceylon," published in 1898, but dating back to the seventies of the last century, has the following opinions from the leading planters of the day:—

"After all that has been written on the subject, I see no reason to believe otherwise than that leaf disease is nothing but nature's own punishment for our neglect of her laws, and looking for a miraculous growth of coffee, when year after year we have eaten up our soil capital. Sulphuring is an old and very doubtful remedy for a similar disease in hops, and no doubt about as useful as it is in certain forms of skin disease: it may palliate, but it won't effect a cure. We must stick to constitutional treatment, and nothing else will serve our purpose effectually, as the vine growers of France have found out."

"We have found out during the last three years that if coffee be not cultivated it will not bear. With regard to the advisability, or I would rather say, the vital necessity of cultivating, look back on the results of the working of the past three years. We learn some lessons that should not be

ignored by us: for instance, what has been the result of neglecting coffee altogether? The result has been no crop at all! And I venture to say, that three years ago, few of those who determined to stop cultivating their coffee anticipated the result. They may have thought that in place of getting 5 cwt. per acre, they would get 3 cwt. per acre, but they did not anticipate getting only 3 bushels per acre, or not enough to keep an estate in any sort of cultivation."

"What is the remedy? or what are the remedies? Almost everything has been tried (in the way of outward treatment). What are we to persevere with, or in what direction is the treatment to be changed? This we know that the prominent symptom of the patient is debility, and that the prominent cause is an external affection. Tonics are good, but they alone are not usually supposed to be sufficient to cure irritating skin diseases."

"Sourness of the soil is a great enemy to coffee cultivation. So are bad tillage, stagnation, decaying stumps, which are all causes of fungoid growths."

"A heavily pruned tree is quickly attacked with leaf disease. Frequently the mere digging of the soil is equal to a manuring ....., Even the richest manure would probably be thrown away, unless the ground were first well stirred up, and left for a couple of years to be ærated."

"It is a fact that roots near the surface suffer more from heat and dryness, than roots growing deeper down. The deeper the bed of the soil in which the roots seek their food, and the more perfectly it is permeable, the greater the amount of fertilising which will be left behind by the rain ....A thorough pulverising of the soil is followed by a perfect net-work of roots."

"One season, just before the hot dry weather set in my friend took and thoroughly dug up a field. His neighbours of course, seeing something new, thought him mad, predicting how the soil would be dried and the trees burnt up. But the sun came, and the rains ceased, and the plainly perceptible result was that all through the scorching drought the dug coffee looked far better than the undug—and the prophets were nowhere!"

Again, "The holes were three feet deep and wide, and were filled with manure (presumably mixed with earth) before the plant was put in. This coffee was most luxuriant: once or twice it must have yielded over a ton per acre, and gave consecutive crops of 15, 16, and 17 cwt. per acre; and though now 18 or 19 years old is still the finest coffee on the estate." Here the marked success was obviously the result of deep digging and the wide field of root nutriment.

Arnold in his "Coffee: its Cultivation and Profit," published in 1886, says in reference to leaf disease in Ceylon: "The estates best suited to coffee have been *worked out*.....High cultivation and abundance of suitable manure are all that can be recommended, with plentiful shade in the hotter localities."

Elliott in his "Coffee Planting in Mysore" 1894, states that he has traced leaf disease back to 1864, but that it has probably existed in Mysore as long as coffee has. Then he goes on to say, "Though coffee in Mysore is

liable to two diseases, and to the attack of one insect, these when the cultivation is good, and the shade suitable in kind and degree are not likely to cause any uneasiness in the minds of the planters. I do feel absolutely certain that when the land is well cultivated, manured and judiciously shaded with good caste trees, leaf disease may be reduced to such a degree, that we need not trouble ourselves about it.....A planter on the slopes of the Nilgiris gave me a well-marked instance of leaf disease being increased from want of digging, when there was a good opportunity of contrasting, the dug with the undug soil. . .....Mr. Anderson in his communication to me, lays, and very rightly, particular stress on the maintenance of the physical condition of the land and its state of fertility. And it is satisfactory to find that he is exact ly confirmed by Mr. H. Marshall Ward in his third report, dated 1881, on coffee leaf disease in Ceylon."

In Alford Nicholl's, "Text Book of Tropical Agriculture," 1892, he lays down that, "In case of all blights, it will probably be found that the trees are weakly on account of bad cultivation and exhausted soil, or perhaps unsuitability of climate. For the first thing to be done is to endeavour to restore the vigour of the trees by proper tillage, careful weeding and judicious manuring, and very frequently these are the only resources of the planter. But then fortunately they are powerful agents in the prevention and cure of blights, for a vigorous tree may throw off a blight, under which a weakly one would wither and die."

Finally, Sir George Watt, in his "Commercial Products of India," 1908, gives it as his matured opinion after personally investigating for Government the condition of the coffee industry in Southern India that. "Where leaf disease is at all serious, it is so prevalent as to render most of the methods of treatment that have yet been suggested, quite impracticable. Syringing with fungicides, such as Bordeaux Mixture, sulphuring the leaves, removing and burning the leaves, tearing off or punching the diseased portions, have each and all been advocated and tried with varying, though never with complete success. The best results as yet recorded have been attained by producing a stronger, more vigorous plant, through increasing the spacing, lessening the shade, improving the drainage, manuring liberally, and restraining the pruner's knife....." "To expect that any lands however admirably drained, weeded and mulched, could continue indefinitely to yield coffee, or any other crop, without tillage and manure, is to carry natural law to a perilous and unjustifiable extreme....." "It would indeed be an unwarrantable assumption to affirm that what may be true with a wild plant must be true universally with the same plant under the abnormal demands of cultivation."....

"There would seem little doubt that had the Ceylon planters cultivated and manured their estates more thoroughly and systematically than they did, their industry might have been saved. When the (leaf) disease appeared both the soil and plant were exhausted."

J. B. LESLIE-ROGERS.

Ootacamund,

22nd October, 1916.

The Planters' Chronicle.

RECOGNISED AS THE OFFICIAL ORGAN OF THE U. P. A. S. I., INCORPORATED.

(Secretary's Registered Telegraphic Address "Planting," Bangalore.)

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THE U. P. A. S. I.

(INCORPORATED.)

Contents.

We publish the third quarterly General Meeting of the Mundakayam Planters' Association. As regards the Rubber Growers' Association Resolution passed at the last General Meeting the Secretary has heard from the Secretary R. G. A. that "the Council were gratified to read the remarks of Mr. Browne at the U. P. A. S. I. General Meeting. The Council also acknowledge and thank the U. P. A. S. I. for the Resolutions passed in reference to the R. G A. and the Excess Profits Duty." With regard to the latter the telegram that appeared on this subject will need corroboration and explanation.

We publish also the Proceedings of fhe Third Quarterly Meeting of the Central Travancore Planters' Association.

Under the heading of Rubber with a sub-heading of Cause of Variability of Vulcanisation of Plantation Rubber, we publish digests from two important papers on this subject which will be read with interest and attention by all Rubber planters. Especially would we call attention to the last para. which emphasises the importance of surporting the R. G. A., to which every rubber growing property in India ought to belong.

Through the courtesy of the Rubber Growers' Association we are enabled to reproduce two charts showing the relation of yield to rainfall in Ceylon and Malaya.

Doctor Leslie C. Coleman kindly writes a letter on growths on Coffee Roots which will attract the attention of all Coffee Planters.

The usual Weekly Report on Markets, Prices and Statistics is published.

SOUTH INDIA PLANTERS' WAR FUND.

	Rs.	A.	P.
Amount previously acknowledged	53,575	9	11
Mr. P. G. Tipping	60	0	0
The Hon'ble Mr. E. F. Barber	100	0	0
Mr. C. Danvers	20	0	0
Mr. Stephen Bayly	20	0	0
Total...	53,775	9	11

DISTRICT PLANTERS' ASSOCIATIONS

Mundakayam Planters' Association.

Proceedings of the Third Quarterly General Meeting of the Mundakayam Planters' Association held at the Mundakayam Club, on Saturday, 7th October 1916, at 10 a.m.

PRESENT.—Messrs. H. M. E. Howson (Chairman), R. Harley, J. R. Vincent, A. Hamond, E. E. Eyre, N. Pollock, E. Vincent, W. R. Stainforth, T. W. H. Fitchett and C. Hendry. *By Proxy* William Hendry:—*Visitor* J. Rankeillor.

Minutes of the last Meeting were taken as read and confirmed.

REPORT OF THE BANGALORE DELEGATE.—In the absence of the Delegate Mr. S. P. Eaton, the Chairman called upon the Ag. Honorary Secretary to read his report which read as follows:—

Gentlemen,—You have doubtless all read the Reports of the Secretary, Labour Director and Deputy Director of Agriculture, so that it is hardly necessary for me to refer to same. Mr. Anstead kindly promised to visit this District when making his next tour at a date to be arranged later. Dr. Coleman and Mr. McRae delivered most interesting lectures on Agriculture and Leaf Disease of Rubber respectively, which you have already seen in the *Planters' Chronicle*. Mr. McRae's lecture was particularly interesting to us down here, and it is evident he has taken a deep interest in his subject. His remarks are you will agree the last word on this particular disease. Mr. Anstead made some interesting remarks on fertilisers, which I think have also appeared in the *Chronicle*.

RUBBER GROWERS' ASSOCIATION.—A resolution proposed by the Chairman that all Estates should become members was unanimously passed. I think most of the Estates in this Association are already members but those who are not would do well to join as the benefits received are very large and the subscription is after all most reasonable. Until all Estates come into line there is very little chance of Research work being started in South India, and you will agree that this is a most necessary thing for the future welfare of the Industry.

While speaking on this subject I think it would be well to draw attention to the very high premium which Para holds over Plantation Rubber at present. This must undoubtedly be due to manipulation of the market, *i.e.*, manipulation by the Buyers. Could not the Sellers combine to overcome this state of affairs which is affecting the Plantation industry most seriously at present; and would it not be possible for the R. G. A. to help to bring about this "consummation devoutly to be wished"? I make the above remarks in ignorance of what the R. G. A. may actually be doing, and for all I know they may be doing everything possible. It is interesting to note that Experiments, recently carried out by Mr. L. E. Campbell, Research Chemist of the Ceylon Government, confirm the idea that the premium on Para over Plantation has nothing to do with the relative merits of the rubber.

I had much pleasure in seconding the Resolutions of Mr. Hatton Robinson and Mr. Kirwan. You all know how hard the Excess Profits Duty hits the rubber industry, especially young Estates just coming into bearing and how necessary it is to get the present duty modified.

MERCANTILE SHIPPING TONNAGE.—It was agreed that very little could be done at present, but it was resolved to ask the Madras Government to approach the Imperial Government representing the necessity for taking steps to replace the losses of Mercantile Shipping Tonnage so as to relieve the present situation at the termination of the War.

PLANTERS' BENEVOLENT FUND.—The rules were slightly altered so that now any subscriber contributing Rs. 200, no matter how long a period his subscriptions are spread over, will become a Patron of the Fund.

PLANTERS' CHRONICLE.—I would draw your attention to the invitation to submit designs for the cover of the *Planters' Chronicle* and I trust there will be a ready response from the Artists of this District.

In future a list of current bulletins on Agricultural matter is to be published with the cost and where obtainable. This is an excellent innovation and will be much appreciated.

The question of advertising produce for sale was discussed. Mr. Hamilton of Messrs. Volkart Bros. spoke against this very strongly but his arguments did not find much favour with the members present, who generally agreed that advertising would conduce to better prices. I take it that Proprietary Planters will be amongst those most interested in this idea and it seems to me it cannot possibly do harm and may do them good in getting better offers. This is another way in which the *Planters' Chronicle* can be made useful.

ST. GEORGE'S HOMES.—You have perhaps read the Rev. F. Breeden's eloquent speech on this subject. In this connection I would put forward the suggestion for your careful consideration that we should not only support this Institution privately but also as an Association. It is sadly in need of funds and has had to refuse many applications for admission on this account. No worthier object for support could possibly be found. All children admitted to the Institute are of British descent and it is as Mr. Breeden very rightly said a disgrace to us in our own eyes and more especially in those of the native if we cannot look after those of our own blood. It is only necessary to inform you that if the funds were available, scores more children could be admitted.

ELECTION OF PLANTING MEMBER OF COUNCIL.—As instructed by you I withdrew your resolution in favour of that of the Wynaad Association which I seconded and which was passed unanimously.

I also withdrew our Resolutions *re.* the Combined Travancore Planters' Association as there had been no opportunity for the Combined Association to discuss these before the Meeting.

I am sorry I shall not be here personally to make my Report but I trust that I have touched on all subjects of interest to you.

In conclusion I wish to thank you very much for the honor you have done me in electing me your Representative.

Mr. J. R. Vincent proposed a vote of thanks to Mr. S. P. Eaton for representing the Association to be sent to him by the Honorary Secretary. —Carried Unanimously.

ST. GEORGE'S HOMES.—A letter from Mr. Eaton on this subject was read to the meeting and after considerable discussion Mr. Eyre proposed that discussion on the subject be postponed until after the War. This was seconded by Mr. Hamond and carried.

The Chairman suggested that in the meantime all individuals who were in a position to do so should subscribe privately to this deserving Institution.

TOWN IMPROVEMENT COMMITTEE.—Mr. J. R. Vincent moved that a committee be formed to meet Mr. Robinson with the object of discussing the matter of a T. I. C. This was seconded by Mr. Eyre and carried. Messrs. J. R. Vincent, H. M. E. Howson, C. Hendry and H. B. Kirk were appointed.

MUNDAKAYAM CIGARETTE FUND.—Mr. E. Vincent stated that subscriptions had now been received and that the accounts were closed. It was considered unnecessary to continue this Fund.

KODIMATHA LANDING STAGE.—The Chairman informed the meeting that orders on the Treasury had now been received from Government in repayment of the loan given to them by the Association. The Honorary Secretary was instructed to collect the amount and repay the Estates concerned; expenses incurred in collecting the cash to be borne by the Association.

LABOUR.—A letter was read from the Honorary Secretary of the South Travancore Planters' Association stating the views of his committee regarding a labour dispute between Mr. Harley and a member of that Association. Their conclusion was considered to be hardly satisfactory and after discussion Mr. J. R. Vincent proposed the Secretary should reply "that the policy proposed by their committee of allowing these matters to be settled by Maistries themselves is hardly conducive to efficient control of the labour of either district and that this Association would be glad to try and come to some arrangement with the South Travancore Planters' Association for use in further disputes." This was seconded by Mr. Hamond and carried.

A letter received from the Director of the Labour Department requesting a copy of the last edition of the Labour rules in force in the District was read to the meeting. The Secretary was instructed to send a copy if a spare one was available.

ELECTION OF SRI MULAM POPULAR ASSEMBLY DELEGATE.—On the vote of the Meeting Mr. E. Vincent was elected by a large majority to represent the Association at the ensuing assembly.

RUBBER GROWERS' ASSOCIATION.—Mr. Howson informed the meeting of his inability to attend the coming meeting of the local branch of Rubber Growers' Association at Cochin. Mr. J. R. Vincent very kindly volunteered to represent the Association in his stead. Mr. Eyre then proposed that the following resolution be brought up at the meeting:—"That the local branch of the R. G. A. be asked if their parent Association is taking any action with regard to the causes which are keeping down the price of Plantation Rubber." This was seconded by Mr. J. R. Vincent and carried,

PESTS AND DISEASES.—Mr. J. R. Vincent proposed "that the Association approach the Travancore Government with the request that they should ask the British Government to lend to Travancore the services of the British Mycologist for the investigation of Rubber diseases. This was seconded by Mr. Harley and carried.

RUBBER THEFTS ACT.—Mr. Harley drew the attention of members to the Rubber Thefts Act which was discussed in Committee. The Honorary Secretary was requested to obtain and send copies of the Act to every member of the Association and place the matter on the Agenda for the next meeting.

ELECTION OF THE HONORARY SECRETARY.—Mr. E. Vincent was unanimously elected Honorary Secretary of the Association in place of Mr. S. P. Eaton who has left the District.

The Annual General Meeting was fixed for January 13th, 1916.

A vote of thanks to the Chair then closed the Proceedings.

(Signed) H. M. E. HOWSON,
Chairman.

(„) CHARLES HENDRY,
Ag. *Honorary Secretary.*

Central Travancore Planters' Association.

Proceedings of 3rd Quarterly Meeting of Central Travancore Planters' Association, Peermade, held at Ladrum Bungalow, on 21st October, 1916.

PRESENT.—Messrs. F. Bissett (Chairman), W. H. G. Leahy, F. W. Winterbotham, C. A. Mackenzie and W. A. J. Milner (Honorary Secretary).

1. The minutes of last meeting were taken as read and confirmed.

2. COMMITTEE MEETING OF 28TH SEPTEMBER.—The Chairman explained the principal business done at this meeting, which related to certain proposals by the Madura Co. for the better handling of our back-water transport. The Madura Co's representative was present to explain matters to the Committee and promised to circularise all members of the Association as soon as possible giving particulars of charges, etc.

Members should receive this letter shortly.

3. All correspondence since last meeting was read:—

EXPORT DUTY.—Read notification in Government of India Gazette of September 26th exempting Travancore tea that has paid Travancore duty from paying the British duty. Recorded with satisfaction.

TIMBER VALUES.—Read notice dated 11th July in Travancore Government Gazette stating that the Rules for sale of forest lands for tea and coffee planting had been modified and that the grantee in future would only have to pay for timber used for building purposes and not for all tree growth on the land as originally proposed. This met with the approval of the meeting.

SHIPPING FREIGHTS.—Correspondence read and it was hoped that some redress could be obtained especially in view of the very low rate of freight enjoyed by tea exporters from Calcutta which places South Indian tea at a great disadvantage in the London market.

ROADS.—Resolved that the Honorary Secretary write to the Chief Engineer and ask him to give instructions for the work on K. K. road from Pambanar towards Kumili to be pushed on rapidly, parts of this road being in a disgraceful condition.

It was also proposed that the Honorary Secretary Peermade Road Committee be written that it was the opinion of the meeting that in view of the very substantial additional revenue the Durbar are obtaining from us by the export duty on tea the debts incurred in upkeeping our grant-in-aid roads be paid by Government.—Carried unanimously.

BOOK OF PROCEEDINGS.—Read letter from Secretary U. P. A. S. I. regarding this and it was decided that a copy of the Book of Proceedings of the Annual U. P. A. S. I. Meeting be ordered for each member and paid for out of C. T. P. A. funds.

4. BANGALORE DELEGATE'S REPORT.—Owing to the illness of the delegate this was most unfortunately not forthcoming.

5. SRI MULLAM DELEGATE.—Proposed from the Chair—

"That Mr. R. Tait be asked to represent this Association at the next Sri Mullam Popular Assembly."

6. ELECTION OF HONORARY MEMBER.—The Hon. Secretary was instructed to write and invite the District Magistrate Mr. L. K. Fearon, to become an Hon. Member of the Association.

7. ST. GEORGE'S HOMES.—Resolved that the appeal for support of these homes be circulated to all members.

A vote of thanks to Mr. Winterbotham for the use of his bungalow was carried with applause, all present wishing Mr. and Mrs. Winterbotham the best of luck in their new billet.

With a vote of thanks to the Chair the meeting closed.

(Signed) W. A. J. MILNER,
Honorary Secretary.

CORRESPONDENCE.

No. 809/Mis.

Office of the Director of Agriculture,
in Mysore,
Bangalore, dated October 26th, 1916.

THE EDITOR,
Planters' Chronicle.

Growths on Coffee Roots.

Dear Sir,—I received a short time ago from Mr. R. W. B. Gompertz, of Yercaud, specimens of a growth on coffee roots. The growths resemble to some extent very irregular potato tubers embracing the coffee roots which were about ¼ inch in diameter. They turned out on examination to belong to a group of parasites known as the Balanophoraceae. The particular species concerned could not be identified with absolute certainty but is in all probability Balanophora indica.

This parasite is not a fungus but a flowering plant which has given up the task of gathering its own food materials from soil and air and lives entirely upon the host plant to whose roots it is attached. As far as I have been able to ascertain it has never been previously reported attacking coffee but it is known to attack forest trees and shrubs in India and Ceylon. It seems very probable that a search will reveal its presence on coffee roots in other estates and I should be glad to receive information as to its occurrence from any planters who may have noticed it.

The specimens received by me had not yet developed their flower stalks and so were revealed only during digging operations. The flower stalks will of course appear above the ground and the flower spikes will probably bear a superficial resemblance to colourless orchids.

The pest is not likely to be a serious one but the removal of flower stalks where they occur should certainly be carried out so as to prevent the distribution of seed.

Yours faithfully,
LESLIE C. COLEMAN,
Director of Agriculture.

RUBBER.

Cause of Variability of Vulcanisation of Plantation Rubber.

Two important papers on this subject giving the results of their experiments have been published by B. J. Eaton and J. Grantham, in the *Agricultural Bulletin of the Federated Malay States.* The first paper on the subject was communicated by the authors to the Society of *Chemical Industry* and appears in the *Journal* of the Society (XXXIV. 19) of 15th October 1915.

Opinions expressed by manufacturers generally agree that variation is considerable even in the case of first latex rubber when compared with fine hard Para, while rubber chemists have all along maintained that the best grades of plantation rubber, especially sheet, are superior to fine hard Para. To examine and reconcile these two opinions Eaton and Grantham made a careful examination, based on a large number of experiments, of the causes of variability in plantation rubber, and in these papers their results and conclusions are given. They were enabled to undertake this work because the Agricultural Department of the Federated Malay States were far sighted enough to establish an experimental vulcanising and testing laboratory.

For the details of the methods used in the experiments the original papers should be consulted. Suffice it to say here that in each case the mixing used was 90 parts of raw rubber with 10 parts of sulphur, that is 10% of sulphur calculated on the mixture. A series of cures were carried out on each sample in which the time varied from about one to three hours at a temperature of about 140° C. The final tests were made on a Schopper testing machine on rings cut from the vulcanised slabs. The optimum cure was taken as the point at which the product of the breaking load per unit cross section and the elongation is a maximum. The product of the load and extension was plotted against the time of cure and a curve obtained which, when it reaches its maximum, shows the optimum time of cure, and though the curves in many cases exhibited irregularities their shape was remarkably constant.

The samples of rubber experimented on were all prepared from latex of specific gravity 0·9910 coagulated by 3 ounces of 5% Acetic Acid per gallon, corresponding to 1·5 lb of dry rubber per gallon.

The results obtained are thus summarised by the authors:—

(1) The variation is connected principally with the behaviour of the rubber on vulcanisation, that is its rate of cure, and not in respect to its strength, elasticity, and general mechanical properties, especially in the case of properly prepared first latex samples.

(2) If the rate of cure be known, or ascertained under specific conditions, vulcanised rubber having similar mechanical properties can be made from all good samples of latex rubbers.

(3) A difference in mechanical properties does exist, even among first quality rubbers, but these differences are greater between high and low grade plantation rubbers; some rubbers never attain the maximum mechanical properties reached by others, whatever period of cure is adopted. These differences in the case of first latex rubbers, however, are not so

important to the manufacturer as the differences in rate of cure, and are not of the same order. The remarkable uniformity in the type of curves points to the fact that the variation of mechanical properties in the samples experimented with is of an accidental nature, for at points below the breaking point the mechanical properties are the same.

(4) The rate of cure is due to the presence of some non-caoutchouc substance in the latex, possibly protein or some other organic constituent, or to some degradation product derived from these substances, which acts as a catalyst, and accelerates the rate of cure.

(5) This substance may be already present in the latex and its amount in the raw rubber determined by the mode of preparation and coagulation, or it may be subsequently formed in the latex by decomposition and taken up by the rubber in variable quantity, according to mode of preparation, or alternatively it may be formed in the coagulum in variable quantity, depending on the amount of serum, or moisture, left in the coagulum, or the presence of preservatives which hinder or prevent its formation.

(6) Smoking, removal of serum in the washing and machining processes, and preservatives are among the artificial factors which either hinder the formation of this substance, or if it already exists in the prepared rubber, partially destroy it.

(7) The catalytic substance is probably not greatly affected by heat, since in the process of mixing and vulcanisation the rubber is subjected to relatively high temperatures.

(8) The rate of cure of a rubber under specific conditions is not indicated in any way by the apparent mechanical, or any other apparent properties of the raw material, hence the worthlessness of the present methods of valuation of rubber.

(9) Other things being equal a manufacturer generally prefers a rapidly curing rubber, since it represents economy in heat, labour, and time costs, and secondly a rubber which cures rapidly is said to have better keeping qualities after vulcanisation.

(10) Uniformity between first latex rubbers from different estates will probably be very difficult of attainment with present methods, owing to the number of factors involved, but should not be so difficult among such rubbers from the same estate.

From this summary we may conclude that first of all a rapidly curing rubber is a desirable object for estates to aim at. In the second place to avoid variations in the bulk the rubber from the latex collected during a series of days should form part of one block, and should be packed and shipped separately. In the third place it is apparent that the present system of valuing rubber by its appearance, by pulling it and stretching it, and so on is quite futile, and should be replaced as soon as possible by some more reliable and scientific method. The authors point out that at the present time if a rapidly curing sample of rubber is placed on the market it would probably fetch 2*d*. to 3*d*. less than a sample of smoked sheet or pale crepe having a pretty appearance, although in reality it would pay the manufacturer to give 1*d*. to 2*d*. above the average market value of the first qualities for it owing to his ultimate saving in steam and heating costs and in time and labour owing to its more rapid curing properties.

In the paper summarised above Eaton and Grantham put forward a theory that the variability in respect to rate of cure, the most important variation in different raw rubbers, is due either to some accelerating substance, probably the protein, present in small quantities in the original latex and in the rubber prepared from such latex, or to some substance produced subsequently in the raw rubber from a constituent, probably the protein, present in the latex.

In a paper communicated to the Society of Chemical Industry and published in their *Journal* (XXXV. 13) in July 1916 the authors describe and discuss their experiments devised to test this theory.

The primary influence on the amount of a retarding substance is the quantity of serum left in the raw rubber, and the greater the amount of serum left in the coagulated rubber for a certain period, the greater the rapidity of cure. Smoking of freshly coagulated rubber retards the rate of cure as do certain antiseptics such as formalin.

The conclusions reached by the authors as a result of a large number of experiments are:

(1) That the rate of vulcanisation of rubber from any given latex is determined by the extent to which a certain change takes place subsequent to coagulation.

(2) This change is normally limited to the first few days after coagulation. The change is progressive and reaches a maximum in slab rubber, that is rubber containing a large proportion of the serum, in approximately six days after coagulation.

(3) The change can be arrested either partially or completely by the action of formalin, heat, and cold. It is also arrested by crepeing shortly after coagulation, which may be due either to the larger surface exposed, or to the more rapid drying, or to both, combined with the removal of most of the serum in machining to crepe form.

(4) The complete arrest or inhibition of the change by formalin, and by the action of both heat and cold, indicates the formation by biological action of a substance which increases the rate of cure of raw rubber, the decomposition being probably of an anærobic nature. There is no evidence that the change is due to chemical agencies.

The authors then proceed to further examine the nature of the decomposition substance, and as a result of their experiments they reached the conclusion that there exist in the serum two substances, first a substance of the nature of protein, precipitated or coagulated by heat, which is ineffective in accelerating the rate of vulcanisation unless decomposed; and secondly a soluble substance only obtained by evaporation and not easily decomposed which has itself an accelerating action on vulcanisation.

The decomposed precipitated protein is effective in much smaller quantities than the serum residue obtained by evaporation after the heat coagulated protein has been removed.

In the ordinary preparation of sheet and crepe rubbers the greater part of the serum is removed in machining the coagulum and the whole of the soluble products may be washed out in crepeing, so that normally the accelerating effect of the soluble serum is nil. The experiments show the gradual development of the accelerating substance during the first few days after coagulation. This must be attributed to the decomposition of protein which is precipitated with the rubber during coagulation.

An investigation of the nitrogen content of rubber confirms the theory that some substance is produced from the protein which accelerates the rate of cure, the nitrogenous portion which becomes soluble in water and is removed on crepeing being non-essential, The high nitrogen content of rapidly curing rubbers produced by the evaporation of the latex without decomposition of the protein, confirms the theory of the presence of a second factor which is probably of a non-nitrogenous nature.

The experiments show why it has not been possible hitherto to connect the nitrogen content of a rubber with its rate of cure, since a rapidly curing rubber may have either a low or a high nitrogen content.

Finally it has been found that the protein left in sheet of average thickness can be decomposed and so produce a more rapidly curing sheet rubber by simply rolling up the sheets after machining in order to retain a sufficient moisture content for the bacterial decomposition, which demonstrates that the rapidity of cure of the so called slab rubber is largely due to the decomposition of protein normally retained by the rubber, even after rolling to sheet form.

These results also show the importance of the rate of drying during early stages as a factor in the preparation of sheet rubber, in order to have a uniform rate of cure.

Use of Alkalies in the Preparation of Plantation Rubber,

It has been found by Martin and also by Eaton (*Ag. Bull. F. M. S. IV.* 6) that solutions of Caustic soda, Caustic potash, and Sodium carbonate have a marked effect in accelerating the rate of cure of plantation rubber. This effect is similar on both slow and fast curing rubbers, and appears, in the present state of our knowledge, to be due to some chemical action on some constituent of the rubber. The evidence on this point is, however, still incomplete, and further experiments are being undertaken to clear the matter up. The acceleration might possibly be due to a neutralisation of residual acid, and the production of a more suitable medium for the organisms to which the changes brought about in rubber causing acceleration in rate of cure are attributable.

Sulphuric acid and other mineral acids, potash alum, and probably other mineral salts retard the rate of vulcanisation, the effect being more and more marked as the minimum quantity of these reagents necessary for coagulation is exceeded. This is most important as it has been suggested that Sulphuric acid should be substituted for Acetic acid as a coagulant in view of the increasing scarcity and price of the latter. It shows that great care will have to be taken if mineral acids are used in place of Acetic acid to maintain standard conditions, much more so than in the case of Acetic acid, a moderate excess of which over the actual minimum necessary for coagulation has little effect.

The Rubber Growers' Association have issued a circular warning rubber planters against the use of alkalies in the preparation of raw rubber owing to its deteriorating effect on manufactured rubber, and its tendency to produce tackiness. It is stated that sooner or later perishing almost invariably sets in if the rubber is prepared with alkalies, and the whole practice is an extremely dangerous one.

MARKETS, PRICES, AND STATISTICS.

Coffee.

Monthly statistics to 30th September.

		1915.	1916.
		tons.	tons.
EAST INDIA—			
Landed to 30th September	...	3,728	6,567
Delivered to 30th September	...	3,104	4,317
Stock on 30th September	...	2,083	2,489
COFFEE OF ALL KINDS—			
Stock in U. K. on 30th September	...	33,750	21,150
European imports to 30th September	...	382,320	442,375
do deliveries to 30th Sept.	...	411,415	511,190
do stock on 30th September	...	226,530	359,000
World's visible supply on 30th September	...	581.000	593,000

An inrease of 59,945 tons compared with an increase of 21,630 tons last year.

Brazil receipts to 7th October.

1916.	1915.	1914.	1913.
5,101,000	5,804,000	2,921,000	5,719,000

Offerings at auction have been :—

—	3—6 Oct.	Since 1st Jan.	Last year.
East India	Nil.	27,102	41,041
Costa Rica	Nil.	93,982	100,588
Other Milds	4,056	68,477	145,458
Brazil	4,186	88,252	108,691
Robusta	Nil.	1,453	13,222
B. E. A. & Uganda	1,916	13,040	10,484

Messrs. T. H. Allan & Co.'s report dated 10th October, states that Coffee in auction has met with rather more demand at fully steady prices. Privately the market remains quiet but firm.

The Mysore Chamber of Commerce Weekly Report dated 30th October states that there is no demand and prices are more or less nominal. Price per maund of 26½ lbs.; Peaberry ranges from Rs. 14 to Rs.16; parchment Rs.11/8; Native, Rs.10/4. Chickmaglur quotes, Peaberry, Rs.14 to Rs.14/8; native No. 1, Rs.11 to Rs.11/4, and native No. 2 Rs.9/8 to Rs.10 per maund of 28 lbs.

Tea.

There has been a better demand and prices are steady to rather dearer, although irregular. The following prices were obtained for South Indian Tea at the sale of 9th October and 11th October :—

—	B.O.P.	O. P.	B. P.	Pek.	P. S.	P. F.	Fgs.	Dust.
TRAVANCORE.								
Glenmore ...	...	...	9½	8¾	...	...	...	...
Periavurrai ...	...	...	10½	9½	...	10¾	...	...
Vaganurrai ...	10½*	10	10½	9½*	...	...	...	...
Venture ...	10	...	...	9	8*	...	...	9
Carady Goody ...	...	9	9¾	9	8½	10	...	...

—	B.O.P.	O. P.	B. P.	Pek.	P. S.	P. F.	Fgs.	Dust.
TRAVANCORE.								
Nellimunda ...	9¾	9	9¼	...	8½	...	...	...
Nullatanni ...	...	...	10*	9¼*	10*	...	...	...
Haileyburia ...	8½	...	...	8½	8¼	...	...	...
Lockhart ...	11¼	...	...	9¾	...	...	...	...
Balamore ...	...	...	9¾	9	8¼	...	...	...
Munaar ...	...	...	10¾	9¾	...	...	...	...
Yellapatty ...	11	...	10¾	...	...	...	11	...
Stagbrook ...	10	...	9¾	...	8¾	...	...	...
Fairfield ...	10¼	...	9¾	9¼	...	...	...	...
Wailardie ...	10¼	...	10	9½	8¾	...	...	...
NILGIRIS.								
Daverashola ...	11¾	10	10¼	...	...	...	...	...
Seaforth ...	10½	...	10	9½	...	...	...	...
Mayfield ...	10	...	...	9¼	...	...	...	...
New Hope ...	9¾	9½	...	9¼	8¾	...	...	...

* Withdrawn from sale.

Rubber.

The following quantities of Rubber were imported into Great Britain in centals of 100 lbs. during the month of August :—

	1915.	1916.
From Dutch East Indies ...	6,269	13,023
From French West Africa ...	563	590
From Gold Coast ...	580	998
From Other countries in Africa ...	1,477	7,331
From Peru	559	3,099
From Brazil	16,552	13,095
From British India	852	922
From Straits Settlements	45,063	28,695
From Federated Malay States ...	25,955	38,647
From Ceylon	19,323	20,106
From Other Countries	2,787	1,408
	117,950	127,912

The following quantities in centals of 100 lbs. were re-exported from Great Britain during the month of August :—

To Russia ...	17,213	20,061
To France ...	11,410	22,797
To America ...	54,186	27,579
To Other Countries ...	12,513	10,184
	95,322	80,621

The Rubber market has firmed up again to 2/5½ for crepe and 2/5¼ for smoked sheet. On 12th October it was steady at about ¼*d.* below this.

R. D. A.

The Planters' Chronicle.

RECOGNISED AS THE OFFICIAL ORGAN OF THE U. P. A. S. I., INCORPORATED.

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(INCORPORATED.)

Contents.

The Deputy Director of Agriculture, Planting Districts, publishes an article on Bees and Pollination, and a short para. on Tea in Ceylon.

We publish the Proceedings of the Annual General Meeting of the Bababudan Planters' Association and those of a Meeting of the Wynaad Planters' Association.

Our weekly article on Markets, Prices and Statistics appears.

Mr. Leslie Rogers, in our correspondence columns, contributes a further letter on the subject of Coffee Leaf Disease.

Next week we hope to publish some information from the Labour Department, supplied by the Director, informing subscribers about the late appointments to his Department. Rains which have been unusually plentiful this year caused floods which prevented the Director getting more than half way to Madanapalli.

Widespread congratulations at the marvellous escape of Mrs Nicolls who was a passenger home on board the P. & O. "Arabia" will be accorded the Chairman of the U. P. A. S. I.

Those who have not already ordered the Book of Proceedings for 1916 can now be supplied.

SOUTH INDIA PLANTERS' WAR FUND.

	Rs.	A.	P.
Amount previously acknowledged	53,775	9	11
Mr. R. Lescher	30	0	0
Mr. W. H. Lincoln	20	0	0
Mr. A. Ff. Martin	75	0	0
Mr. A. C. Morrell	25	0	0
Mr. J. S. Nicolls	40	0	0
Mr. J. J. Murphy	200	0	0
Mr. C. J. Hayward	50	0	0
Mr. E. W. Simcock	80	0	0
Mr. A. J. Wright	20	0	0
Mr. D. V. Crowe	7	8	0
Total...	54,323	1	11

SCIENTIFIC DEPARTMENT, U. P. A. S. I.

Bees and Pollination.

We have on several occasions called the attention of Coffee planters to the important role which Bees play in the pollination of fruit trees including Coffee.

The Government Entomologist, in Fiji has recently pointed out that Bees play a very important part in the fertilisation of Coconut flowers. The Coconut Palm bears two kinds of flowers, male flowers supplying pollen and female flowers which, if this pollen is transferred to their stigmas, bear nuts in due course. These two kinds of flowers are borne on the same spadix but they do not mature at the same time and as a rule on any individual Coconut Palm only one lot of flowers are open at any one time. Consequently it is necessary for the Cocoanut to be cross fertilised by the transference of the pollen from the flowers of one tree to the stigmas of the female flowers of another tree. This transference can only take place by means of two agencies, wind or insects.

Bees swarm round the open flowers in large numbers and these useful insects act as involuntary carriers of pollen and pollination agents

The Entomologist noticed that those Palms freely visited by Bees when in flower gave a high yield of nuts, while on certain trees a large percentage of the small nuts fell. He advances the theory that in the latter case the flowers were not visited by Bees and pollination was unsatisfactory and incomplete, and he concludes that the general introduction of Bees on to Coconut plantations is well worth a trial in Fiji.

It may be remarked that much the same thing takes place in the case of the Sago or Toddy Palm-*Caryota urens*. When the great tassels break into blossom they attract the Bees which hum in the tassels all day and when this has occurred it will be noticed that a plentiful crop of seeds follows.

Tea in Ceylon.

The Report of the Department of Agriculture in Ceylon for 1915 states that this was a record year in the Tea industry due to a well distributed rainfall and high prices. The exports of Tea amounted to 215,632,727 lbs. the first time the exports have exceeded 200 million lbs. This represents an increase of 11·3% over 1914. Colombo sales averaged 56·79 cents as compared with 46·35 cents in 1914. The area under tea in Ceylon is approximately 392.500 acres. In the best districts prices have averaged 60 cents with a yield of 700 lbs. and an all in cost of 30 cents.

On the Experiment Plots the practice of Green manuring with an application of Slag and Potash at pruning time has continued to give good results, especially when Dadap and Albizzia is used as the green dressing.

When Tea is interplanted with Rubber the loss of crop due to shade, and the competition of the Rubber roots is well shown by the following results:—

	lbs. made Tea per acre.	Difference. lb.	Per cent.
Singlo jat without Rubber shade ...	1280	—	—
Singlo jat with Rubber shade ...	640	640	50
Assam hybrid without Rubber shade ...	1775	—	—
Assam hybrid with Rubber shade ...	640	1135	64

RUDOLPH D. ANSTEAD,
Deputy Director of Agriculture, Planting Districts.

DISTRICT PLANTERS' ASSOCIATIONS

Bababudan Planters' Association.

Proceedings of the Annual General Meeting of the Association held at the Kadur Club, Chickmaglur, on Wednesday, October 18th 1916.

PRESENT.—Messrs. W. Barnard, A. C. W. Denne, F. Hugonin, H. Kerr, L. E. Kirwan, G. N. Frattini, Scientific Assistant for Mysore, and S. H. Dennis (Honorary Secretary).

Mr. Kirwan who was voted to the Chair, said:—

(1) Gentlemen, before proceeding with the business of the Agenda list, I would remind you that we have to mourn the loss of two of our most prominent members, Mr. Adam Boyd, whom you elected as your President a year ago and who died at home some months ago, and Mr. R. D. Lovett who was killed recently while fighting for his King and Country in France. He went home in the early days of the war and enlisted in the 16th Battalion (Public Schools) Middlesex Regiment. I propose that we pass a vote of condolence with the relatives of these two Gentlemen, and that the Honorary Secretary be asked to write and express the sympathy of the members of this Association with them in their bereavement.

This was done, all present standing.

(2) The minutes of the last Meeting were then read and confirmed.

(3) MR. FRATTINI'S ADDRESS.

Mr. Frattini, the Scientific Officer, then addressed the meeting as follows:—

Mr. Chairman and Gentlemen.—I have been asked by the Honorary Secretary to address you at this Meeting, an honour which I esteem, as this is, I think, the first opportunity I have had of addressing members of the B. P. A. I do not wish to take up too much of your time, gentlemen, so I think I will endeavour to confine myself to one or two subjects.

BLACK ROT.—This disease as you are well aware does a considerable amount of damage on many estates in Mysore which results in an annual loss of crop in some cases of 25 per cent. or even more. As I am not a mycologist in any sense of the word, my investigations were on the lines to obtain a practical method of palliative treatment. These were spraying a number of trees with (1 lime wash (2) Bordeaux mixture. The lime wash treatment proved unsuccessful and so was abandoned; but the trees treated with Bordeaux mixture showed a marked freedom from Black Rot. Most of you are no doubt aware of the history of these experiments, so it is quite unnecessary for me to go into details here. It was the outcome of these experiments and their freedom from an attack of leaf disease when the rest of the estate on which they were conducted became badly infected, which led me to lay down spraying experiments this year in connection with leaf disease. These I am pleased to report have proved very successful. During the long break of the monsoon in July of this year leaf disease at once broke out in the estate, and has continued its ravages up to date. So bad has the attack been that hundreds of trees surrounding the plots are practically denuded of foliage. This I think one of your members can vouch for, as he visited the experimental plots some two or three weeks ago. This in itself, gentlemen, I think is sufficient evidence to warrant the continuation of further

experiments. It has been my desire for some time past to be able to spray an entire estate as an experiment, and I think my hopes are likely to be realised as two of your members have decided to do this, in fact, they have already begun upon the work.

I might mention here that during my recent tour in the Bababudans, I was agreeably surprised to find that such a number of your members had already started experiments in spraying for leaf disease. Some of these were begun last hot weather, and I think the members of the B. P. A., are to be congratulated on their keenness and enterprise.

It is my intention to render every assistance I possibly can to these experimenters to enable them to make their experiments a success.

Leaf Disease.—It has been argued by a correspondent in the columns of the *Planters' Chronicle* that the Scientific Department had begun at the "wrong end of the stick" by experimenting with a preventative treatment of the coffee tree rather than first starting with the "cause and effect." Your Scientific Department is fully alive to this important line of investigation, and also the fact that our trees are not of the vigorous type of years ago, but this is no reason why our existent trees should not be allowed to receive treatment to ward off leaf disease. This is what is required by the practical planter at the present time. Later when your recognised Scientific Department is fully staffed and equipped, the question of improving the strain, and so thereby getting a more disease resistent type, is to be one of the main lines of investigation. The question of whether the allied species of *Hemileia Vastatrix* are capable of infecting coffee is still open to doubt. So far as is known at present they do not. The species are so very similar that no one short of a mycologist is able to prove this point. I believe that Dr. Coleman, Director of Agriculture, Mysore, is shortly taking up the study of the life history of coffee leaf disease, and no doubt the results of his investigations will considerably add to our knowledge, which will render any preventative treatment far more valuable as it will then be possible to apply it exactly at the right time and not go groping in the dark as we are at present. The interesting result which Dr. Coleman has obtained in one of his areca gardens where he has so effectually sprayed the areca nuts over a period of several years, that the koleroga disease has been stamped out and no reappearance has been noticed. It may not perhaps be too much to hope for the same satisfactory result when spraying a coffee estate for leaf disease. The estate, of course, no doubt, might have to be sprayed thoroughly over a period of two or three years which would necessitate a considerable increase of annual expenditure, but if after that time the estate remain free from infection for a number of years, would not the amount of crop annually saved more than warrant this extra expenditure? If it was possible to accurately ascertain the total amount of crop lost which could be directly attributed to leaf disease or Black Rot I am sure the sum total in rupees, annas and pies would absolutely amaze you.

What does an attack of leaf disease in the nature of an epidemic mean to the estate? Does not an attack, say in December and January, damp your prospects for the coming year? Does not an attack in September, October, kill off a great deal wood that might otherwise have cropped the following year? These are not the only important factors, gentlemen. It is my opinion that if we are successful in warding off severe attacks of leaf disease there is every possibility of counteracting at least a part of this extra expenditure by a reduction in the manure bill. It is my belief that the ordinary coffee tree does not use all the manure we apply. Then why do we apply so much? Simply because if our trees are bearing at all heavily and they are attacked by leaf disease they will be weakened to such an extent as

to render them unable to ripen their crop. Several planters who have visited the experimental plots have argued that as a direct result of spraying with Bordeaux mixture the trees have put on crop. This argument is not quite correct. Bordeaux mixture can no more put on crop than a manure can. But it has helped in this way, supplying Bordeaux mixture as a disease preventative the tree has remained healthy and done only what nature meant it to do *i.e.*, blossom and set its fruit.

Another experiment conducted which is worthy of mention is spraying the mulch and stems of trees only. It has been my opinion for the past three years that the mulch although an excellent preserver of tilth is also a bad offender in harbouring fungus spores. After a field of coffee has recovered from an attack of leaf disease the mulch still remains as a subsequent source of infection. This experiment has proved a great success and has shown a marked freedom from leaf disease.

Bordeaux Mixture.—This was the invention of a Frenchman and was used to a large extent in the province of Bordeaux in France for spraying grape vines to prevent theft, and accidentally it was found that the vines to which it was applied remained free from the dreaded vine disease, *Phylloxera*. There are numerous formulæ which may be used for the preparation of Bordeaux mixture. The two formulæ used in connection with spraying for leaf disease and Black Rot are a weak and strong mixture. The weak mixture is as follows:—4 lbs. quick lime, 4 lbs. copper sulphate, 50, gallons of water. The strong mixture.—4 lbs. quick lime, 4 lbs. copper sulphate, 24 gallons of water. Copper sulphate at pre-war prices could be obtained from the Coast at Rs. 25 per cwt. But it has now risen to the enormous price of Rs. 70 per cwt. I believe now, however, that one or two of your members here present have received quotations from Bombay for copper sulphate at Rs. 45. I would advise members before ordering to write for a pound or two as a sample for quality. The next important ingredient is quick lime. I would impress upon you, gentlemen, the importance of having your lime fresh and unslaked. During my recent tour I visited two estates where spraying was about to be begun, I found that acting under my advice these estates had ordered quick lime packed in sealed tins, but although this was sold under a guarantee, a great deal was found to be air-slaked and the residual matter in both cases after slaking was over 25 per cent. and this consisted of unburnt shell, sand and small stones. Of course to obtain lime in absolutely an unslaked condition is impossible, but that the percentage of air-slaked lime should be kept down to a minimum is essential. If your lime is largely of the carbonate (air-slaked) then the fungicidal properties of the resultant Bordeaux mixture will be materially reduced.

Sprayers.—Owing to the European war it is now practically impossible to obtain a really good sprayer suitable for coffee. Undoubtedly the best type is the pneumatic sprayer. This leaves both hands of the operator free which is essential when spraying coffee, as it is necessary to lift the branches to enable the spray to be directed on the under surface of the leaves. Spraying must be under the strictest supervision. This I have found from practical experience. The ordinary cooly does not understand its usefulness. He thinks it is one of the Sahib's mad ideas. Bad spraying is worth neither time nor money wasted upon it. I would advise you, gentlemen, never to put gangs of coolies on to do sprayings by contract, as this is not by any means conducive to good spraying. I would suggest also that, wherever possible, the Bordeaux mixture required for the day should be mixed by yourself or some reliable person. It is important the mixture should be properly prepared, otherwise its effectiveness is impaired.

I would conclude, gentlemen, by thanking those members who have made my recent tour in the Bababudans such a pleasant one and for their hospitality and kindness.

On the conclusion of the address a vote of thanks was proposed by Mr. Kirwan and seconded by Mr. Hugonin, and it was decided that the address be included in the minutes.

(4) HONORARY SECRETARY'S REPORT AND ACCOUNTS FOR 1915-16.

Mr. Chairman and Gentlemen.—My Report for the past year is as follows:—The acreage subscribing to the Association has, I regret to inform you, decreased by 335 acres. This is due to a member having resigned and withdrawn 2 Estates comprising 365 acres; but I have also to record a small increase of 30 acres due to a member having increased the area of his Estate to that extent. This leaves us with 5,360 acres on the rolls of the Association, or 25 Estates. During the year 3 meetings were held at Santaveri and Chickmaglur, all of which were well attended.

BENEVOLENT FUND.—I have been asked to appeal for more support to this Fund. At present the contribution from this Association is only Rs. 110 per annum.

ACCOUNTS.—All the books of the Association are on the table. Financially we are well off, having at the close of the past year a credit of Rs. 2,912-0-2. Of this Rs. 2,500 is on fixed deposit with the National Bank of India Ltd., Madras at 4%, and is a useful reserve fund to have. Our only liability at June 30th was Rs.450, which is due to the Assistant Scientific Officer's Fund, and has not yet been called for. At June 30th, only one subscription was outstanding, and that has since been paid. Of the current year's subscriptions there are still 3 to come in.

Before the end of this financial year, we shall have to decide what the subscription to the Association for the coming year (1917-18) is to be. This is necessary, because there are some members standing out of the Assistant Scientific Officer scheme.

I shall be obliged if the Meeting will appoint Auditors to audit the accounts. I must thank members for all the help they have given me during the year, and now tender my resignation.

Messrs. Hugonin and Kerr were appointed to audit the accounts, and the Report was adopted.

(5) ASSISTANT SCIENTIFIC OFFICER FOR MYSORE.—On this subject, the following Resolution, proposed by Mr. Kirwan and seconded by Mr. Kerr, was carried:—

"That this Association is entirely in favour of Mr. Frattini's experiments "being continued for another 5 years, preferably under the control of the "Mysore Agricultural Department, as proposed by the Council of Mysore "Planters' Associations, and it suggests that the requisite funds be raised "by a small Government cess on all lands cultivated with Coffee in the "Mysore Province."

(6) PROPOSED MYSORE PLANTERS' LABOUR BILL.—The letter from the Deputy Commissioner, Kadur District, dated the 30th August, 1916, was read and discussed.

(7) ROADS.—The President. Kadur District Board's letter dated 21-9-16 in re the appointment of a member of this Association to the District Board was read and noted. The Honorary Secretary was requested to write and thank the President for the letter and the promises contained therein.

The Honorary Secretary was also desired to write to the Executive Engineer, Kadur Division, and enquire what progress had been made with the proposed Kulhuttypur-Hebbe road.

(8) SANTAVERI DISPENSARY.—The Special Revenue Officer's letter dated the 17th July, 1916, was read. The Honorary Secretary was requested to write and ask what had been done in this matter.

(9) LABOUR.—With reference to the complaint brought forward by a member that the Lal Bagh Estate was paying higher wages to their labourers than the rest of the District, the Honorary Secretary was requested to write to Messrs. Peirce, Leslie & Co., Ltd. (Managing Agents), Calicut, and point out how unfairly this reacts on neighbouring Estates, and suggesting that they should conform to the rates paid by the rest of the District, and that they put the Lal Bagh Estate on the Bababudan Planters' Association, which exists to protect our mutual interests.

(10) STEALING OF COFFEE AND OF PLANTS.—This matter was discussed at length and Mr. Kirwan said:—"I saw a reference in the report of the proceedings of a recent Meeting of the Nilgiri Planters' Association, under the heading of 'Policing of Coffee,' to special arrangements for the prevention of Coffee thefts to be made from the 18th October. I think we should enquire what special arrangements in this direction are made on the Nilgiris and what steps are being, or are about to be, made in this District in a like manner to prevent the theft of Coffee in the coming season. The experience of some of us in the past year inspires anything but confidence in the preventive agency and detective ability of the local police and Magistracy. I will not go into details here, but I may say that I recently brought the matter to the notice of the Inspector-General of Police, Mysore, Bangalore. He admitted the mistakes of the various Officials concerned, and he very kindly promised to issue a circular pointing out the errors to be avoided and the procedure to be adopted in the future. He also promised help in other directions. I therefore beg to move that the Honorary Secretary be asked to enquire what special arrangements, with a view to the prevention of Coffee stealing, are being taken in this District."

The following Resolution, proposed by Mr. Kirwan and seconded by Mr. Kerr, was carried:—

"That the recent experience of certain members of this Association has inspired anything but confidence in the preventive agency and detective ability of the local Police; that the Honorary Secretary be asked to enquire of the District Magistrate, Kadur, what special arrangements are made in crop time to prevent Coffee stealing in this District, on the lines of those undertaken in British territory; and that a copy of this resolution be sent to the Inspector-General of Police, Bangalore."

Another resolution on this subject, proposed by Mr. Denne and seconded by Mr. Barnard, was also carried, to the following effect:—

"That this Association offers a reward of Rs.25 for the capture of thieves stealing Coffee from the Estates of any member of the B. P. A. on a conviction in the Criminal Courts."

(11) REPORT OF DELEGATES TO U. P. A. S. I. MEETING.—Mr. L. E. Kirwan read the following report:—At the U. P. A. S. I. Annual Meeting, which opened at Bangalore on the 14th August last, this Association was represented by Mr. S. H. Dennis, Honorary Secretary, and Mr. L. E. Kirwan.

The Minutes of the early proceedings and what we may call the "Star" speeches have been published at length in the *Planters' Chronicle* and other papers, and require no reference here.

The Meeting then resolved itself, as you have no doubt read, into various Committees upon each of which your Association was represented by one or other of your Delegates. This method of transacting business, though an innovation, seemed to be entirely successful; and all, or most, differences of opinion having been threshed out in Committee, the passing of the final Resolutions in open Meeting was facilitated and expedited to the general satisfaction.

Mr. Lake's Resolution regarding the Arsikere-Mangalore Railway, "that in view of the recent inspection by Mr. Richards of the proposed route of this Railway, the Government of India be again approached through the Governments of Madras and Mysore as to the desirability of carrying out this project," which was carried unanimously, was seconded by Mr. Kirwan. The latter also proposed a Resolution, which was carried, regarding the Excess Profits Tax, but as this has to do rather with the growers of tea and rubber than with coffee, in which most of those present here to-day are interested, it is unnecessary to go into details.

Our delegates supported a Resolution regarding the British import Duty on Coffee, moved by a Coorg delegate, in the following terms: "Whilst recognising the necessity of taxation, and willingly paying such import duties as the Imperial Government have deemed fit to impose on the importation of coffee into the United Kingdom, this Association wish to bring to the notice of the Imperial Government the present position of coffee, which owing to the great restrictions of markets, and lack of tonnage, etc., brought about by the War, has had a serious setback, and views with alarm and apprehension the possibility of any further increase of the import duty, which would most seriously affect the financial stability of the industry."

A resolution, which was unanimously carried, proposed that all delegates should advise their local Associations to authorise their Secretaries to order a copy of the yearly Book of Proceedings for every member and distribute them either free, or recover the cost from their members as may be arranged.

A resolution was proposed to the effect that the Kalisyndikat Manurial Experimental Fund accounts be closed, and the balance transferred to the General Account for the use of the Scientific Department and that the Experimental Plot Fund be closed in the same manner.

Before agreeing to this your degelates were emphatically assured by Mr. C. H. Browne, the Chairman, the Hon'ble Mr. Barber, the Planting Member, and Mr. R. D. Anstead, the Deputy Director of Agriculture for Planting Districts, that the continuity of the experiments being conducted with the aid of this fund, which experiments are now reaching an interesting stage, would be in no way interfered with.

Your delegates also supported a resolution regarding Mercantile Shipping Tonnage, which is a subject in which we are all closely interested, in the following terms: "That this Association desires to request the Government of India, through the Madras Government, to represent to the Imperial Government the necessity for steps being taken to replace the losses of Mercantile shipping tonnage, and thus to ensure the necessary cargo carrying capacity being available at the termination of hostilities to relieve the present situation, which has caused freights on tea to London to be almost quadrupled since the outbreak of the War and which threatens to restrict planting developments seriously.

These, gentlemen, were the items of chief interest to our community which cropped up during the Conference, which teemed with subjects of importance to planters generally, and was conducted with admirable tact by a Chairman who, as you know, hailed from our near neighbourhood, North Mysore.

Your delegates also accompanied, by request, deputations from the three Mysore Associations which were granted audience by the Dewan Sahib Sir H. Visvesvaraya, Dewan of Mysore and Mr. A. R. Bannerji, I.C.S. who was at that time acting as First Councillor.

In conclusion, we beg to thank you for the honour accorded us in inviting us to represent you at this meeting.

A hearty vote of thanks to the delegates was passed unanimously.

A vote of thanks was accorded to Mr. L. E. Kirwan and Mr. S. H. Dennis for their valuable services.

(1) ELECTION OF OFFICE BEARERS.—The following were elected Office Bearers for the current year:—President, Mr. L. E. Kirwan; Vice-President. Mr. F. Hugonin; Honorary Secretary, Mr. S. H. Dennis; B. P. A. Representative on the Council of Mysore Planters' Association, Mr. F. Hugonin.

The Meeting terminated with votes of thanks to the Chairman and Honorary Secretary.

(Signed) L. E. KIRWAN,
Chairman.
(„) S. H. DENNIS,
Honorary Secretary.

Wynaad Planters' Association.

Proceedings of a Meeting held on October 25th, 1916, at the Meppadi Club.

PRESENT.—Messrs. Bisset, Blackham, Copland, Gauld, Gillatt, Leslie, Lobban, Malcolm, Powell, Vernede, Whitton and Abbott (Honorary Secretary). *Visitors:*—Messrs. Lord and Martin.

Mr. Malcolm in the chair.

2266. NEW MEMBER.—Mr. Lobban was elected.

2267. THE LATE MR. LAMPARD.—The Chairman proposed a vote of regret at the news of Mr. Lampard's death.—Carried all Members standing.

2268. PROCEEDINGS OF THE LAST MEETING were confirmed.

2269. POST AND TELEGRAPHS.—Read correspondence. The Cherambadi-Meppadi Telegraph connection is to be restored. The Sultan's Battery Office has been opened for traffic from October 1st. The question of restoring the former hour of departure of mails from Meppadi is still under consideration.

2270. TIMBER TRAFFIC ON ROADS.—Mr. Gillatt, District Board Member, informed the Meeting that the proposed rules had been passed. The question of registration has been postponed to the next Meeting of the Board. The Association hopes it will be agreed to.

2271. POODAPADY HOTEL.—The Honorary Secretary stated that he had paid Chungaren Rs.50. Mr. Gillatt reported what repairs to the hotel appear necessary. An estimate of the cost will be made. The Meeting thanked Mr. Gillatt.

2272. MR. ANSTEAD'S AND MR. MCRAE'S VISIT.—A programme was arranged.

2273. DISPENSARIES AND HOSPITALS.—The Honorary Secretary stated that Dr. Milton had sent him the statistics which had been forwarded to the Collector.

2274. COFFEE STEALING PREVENTION ACT.—Read letters from the Collector of Malabar and the Secretary, U. P. A. S. I. forwarding correspondence on this subject. Resolved that this Association approves of the rules proposed by the Collector of Salem.

2275. CALICUT-MYSORE FRONTIER ROAD.—Read letter from Mr. Morres. Proposed by Mr. Whitton seconded by Mr. Gillatt that this Association desires to record its appreciation of the good work which has recently been done on the Calicut-Poodapady Road and hopes that this may be continued on the section between Kalpetta and Mysore Frontier.

2276. RESIGNATIONS.—Messrs. Bell and Blackburn have resigned their Membership of the Association.

2277. LABOUR LAW.—Attention was called to 3 cases before the Vayitri Magistrate in which he had inflicted fines on defaulters without any alternative sentence of imprisonment and refused to issue any further direction as no imprisonment had been awarded on the last occasion. This appears to be a misreading of the Act. It was resolved that if an appeal was taken to the High Court the Association would pay the cost. Finally it was decided to hold a special Meeting on November 1st to consider the present administration of the Act in Wynaad and the advisability of asking the Collector of Malabar to receive a deputation.

2278. RECRUITING IN PLANTING DISTRICTS.—Read letter from the Honorary Secretary to the Collector of Malabar with reference to Recruiting for the Army Hospital Corps in Wynaad pointing out that all coolies in Wynaad are under advance to Planters and the Collector's reply regretting that he is unable to make any exception in favour of the Wynaad Taluq. It was noted that a similar circular had been withdrawn in the Nilgiri District.

2279. LABOUR DEPARTMENT.—The Honorary Secretary who had attended the Meeting of the Labour Control Committee in Ootacamund on October 16th gave an account of what had occurred. Mr. Martin, Director of the Labour Department addressed the Meeting on the subject of the advisability of the Association agreeing upon labour rules and the necessity of combination generally in labour matters, (his address is printed separately for the information of Members). Considerable discussion followed, but no resolution was passed.

A vote of thanks to the Chair terminated the Proceedings.

(Signed) B. MALCOLM,
Chairman.

(„) C. E. ABBOTT,
Honorary Secretary.

MARKETS, PRICES, AND STATISTICS.

Tea.

The Indian Tea Association publish the following figures of Tea Exports:—

	1916. lbs.	1915. lbs.
Sailings to Great Britain—		
From Calcutta in September ...	33,577,340	22.977,734
From Chittagong in September ...	1,434,371	6,036,954
From 1st April to 30th Sept. ...	193,954,800	101,035,012
Sailings to Australia & New Zealand—		
In September	771,023	2,601,114
From 1st April to 30th Sept. ...	1,886,147	5,024,045
Sailings to America—		
In September ...	1,043,080	1,694,213
From 1st April to 30th Sept. ...	2,332,072	4,333,653
Sailings to other places—		
In September ...	6,425,404	6,502,049
From 1st April to 30th Sept. ...	18,282,848	16,627,778
Sailings from Southern India—		
In September ...	2,067,951	1,824,665
From 1st April to 30th Sept. ...	9,131,312	10,840,977
Total Sailings—		
In September ...	35.319,169	41,636,729
From 1st April to 30th Sept. ...	135,607,179	137,861,465

The following are the sailings from South Indian ports:—

	lbs.
From Cochin—	
To London	753,489
To Asiatic ports	31,481
From Tuticorin—	
To London	310,300
To St. John N. B.	355,095
To Colombo	74,376
To Bombay	16,625
From Calicut—	
To London	504,035
To Bombay	22,547
Total...	2,067,951

Sailings to Russia during September were:—

To Petrograd	233,863
To Irktusk	34,838
To Moscow	1,824,730
To Odessa	330,195
To Baku	8,070
To Vladivostock	952,652
To Tschelianbinsk	1,001,719
To Stretensk	57,960
To Kokond	25,372
Total ...	4,200,698

The exports of Tea from Ceylon from 1st January to 16th October were, black 155,481,422 lbs. and green 2,741,715 lbs. compared with black 161,852,384 lbs. and green 2,862,738 lbs. during the corresponding period in 1915.

The following prices were obtained for South Indian Teas at the London sales on 16th and 18th October :—

—	B.O.P.	O. P.	B. P.	Pek.	P. S.	P. F.	Fgs.	Dust.
TRAVANCORE.								
Poonmudi ...	10½	...	10	9	...	...	...	...
Surianalli ...	11¾	10	10½	10	...	10¾	...	...
Slagbrook ...	10½	...	10	9¼	...	...	...	...
Glenmore ...	...	...	10¼	9¾	...	...	...	...
Venture ...	10¼	...	...	9½	8¾	...	...	9¼
Merchiston ...	...	9¼	9	8¾	...	9½	...	...
Nellimunda ...	9¾	9	9½	...	8¾	...	...	...
Sirikundra ...	9¾	9½	...	9¼	8¾	...	...	...
NILGIRIS.								
Nonsuch ...	10¾	11¼	...	10½	...	...	...	...
Mayfield ...	10½	9¾	...	9½	...	...	...	...
Cherakara ...	...	9½	10¼	9	8¾	...	9½	...
Daverashola ...	1	...	10½	9½	...	...	...	...
WYNAAD.								
Wentworth ...	10¼	9½	...	9¼	8½	...	...	...
Audatode ...	10½	9½	9½	9	8½	...	10	...
ANAMALLAIS.								
Stanmore ...	9¾	9½	...	9¼	8¾	...	...	...
Paralai ...	10¼	9¼	9¼	...	9¼	9¾	9¾	...

Rubber.

The following quantities of Rubber were imported into Great Britain during September in centals of 100 lbs. :—

	1915.	1916.
From Dutch East Indies ...	4,564	7,873
From French West Africa ...	1,013	227
From Gold Coast ...	452	584
From Other countries in Africa ...	4,363	4,844
From Peru	20	—
From Brazil	9,023	15,684
From British India	3,638	3,922
From Straits Settlements	46,274	57,106
From Federated Malay States ...	23,905	64,495
From Ceylon	18,918	26,907
From Other countries	2,290	4,420
	114,460	166,062

The following quantities were re-exported during September in centals of 100 lbs. :—

To Russia	15,684	9,701
To France	13,866	20,541
To America	54,097	27,186
To Other countries	13,160	8,342
Total ...	96,807	65,770

R. D. A.

CORRESPONDENCE.

Coffee Leaf Disease.

Dear Sir,—I had no intention of prolonging this controversy, as my chief object in writing originally was to draw general attention to the subject, and to bring about if possible a final solution of the vexed questions regarding the origin and cure of the disease. I have said all I want to say, and must now leave it to abler minds to carry on the investigations and arrive at definite conclusions. However, as it appears a reply is expected of me to Dr. Coleman's last communication, I will venture once more, and try again to justify the faith that is in me.

I am asked why I did not make a microscopic examination of the diseased leaves I found in the jungle; and regret is expressed that I did not send the specimens of the infected plants to an expert for identification of the fungus. My reasons for not following this obvious course are as under: To begin with I did not possess a suitable microscope for the purpose, though I did examine the infected leaves with a fairly powerful botanical pocket lens, and could see no clear difference between the disease on the coffee and the jungle leaves. Secondly, not being a member of the U. P. A. S. I. at that time I did not feel justified as an outsider in troubling the Association for an expert opinion. And lastly, the owner of the estate in which, and its neighbourhood, I noticed the disease, refused to take any interest at all in the matter; and in fact strongly resented my saying that there was any such thing as leaf disease in or near his "well managed" estate, and ended by trying to impress on me that he had been a planter all his life and that what he did not know about coffee was not worth knowing. In these adverse circumstances my budding enthusiasm on behalf of the industry was pretty considerably damped, and I reluctantly dropped the subject for the time being. However, soon after I joined the Association the question of leaf disease happened to crop up, and I immediately took that opportunity of placing my experiences before the planting community with a view to eliciting opinions and thoroughly threshing out the whole question.

It is passing strange that though leaf disease has been known to exist for the past sixty years or so, practically nothing definite has been done to this day to solve its origin or produce an effective remedy. It is further known that H. vastatrix, H. woodii, and H. canthii all exist wherever coffee is grown, and that they are very similar in appearance. Therefore it is not an unreasonable presumption that all three have some common origin. There is no such thing in the animal and vegetable kingdoms as spontaneous generation: *ex nihils nihil fit.* The conditions that produce one form of the disease must also be conducive to producing the others, and Watts and Massee are of opinion that they are all identical, only differing as they feed on different hosts. Why then in these circumstances should not the whole subject be impartially taken up in a genuinely enquiring spirit, without prejudice as to the sources from which the information has been derived?

I was considerably surprised to find it said that I was not very fortunate in quoting in my support such well known authorities as Sir George Watts and Mr. Massee. The latter was a Fellow of the Linnean Society, and author of the Text Book of Plant Diseases. He was in charge of the Cryptogamic Section of the Royal Herbarium at Kew, and we must conclude he was competent to hold so important a position, and the

very man to give a dependable opinion on leaf disease. While Dr. Watts, as Sir George was originally known, has about half a dozen distinguished titles after his name, and is recognised for his scientific attainments in Chemistry, Botany, and Agriculture. When in India he was Professor of Botany in the Calcutta University, Superintendent of the Industrial Section of the Calcutta Museum, and Official Reporter on Economic Products to the Government of India. He toured throughout the Tea and Coffee Districts of India, and personally investigated the question of coffee leaf disease: and it cannot for a moment be supposed that either he or Massee based their conclusions on mere theory. As a matter of fact their writings clearly prove that they supplemented their own observations with all previous information on the subject, for they quote the opinions of numerous British and Foreign authorities that lead up to the conclusions at which they arrived. Therefore, instead of the matured opinions of such careful enquirers as Watts and Massee being casually set aside as of little value, would it not be more practical to carry on further investigations on the lines they have so clearly indicated.

By the way, I will take this opportunity of meeting the objection raised by "Sophos" to my use of the word "Empirical," as regards some of the treatment coffee has been subjected to. He says the primary signification of the word is "derived from or known by experience," and that "in planting matters experience is the safest guide." The above is certainly the literal meaning of the original Greek word, but it is not the whole meaning of the word as commonly used. Chambers' Twentieth Century Dictionary lays down that an Empiric "is one whose knowledge is got from experience only," and Empiricism as "the system which, rejecting all *a priori* knowledge, rests solely on experience and induction." While in Annandale's Standard Dictionary an Empiric is said to be, "one who relies only on experience and observation, as opposed to theory based on scientific conclusions," and Empirical as "depending upon experience and observation alone, without due regard to science and theory." My meaning was therefore clear, when I stated in your issue of the 16th September last that, "shading operations have also been on empirical lines, confined solely to the abstract production of shade without consideration of other results such as the impoverishment of the soil and the dissemination of disease by the wrong kind of tree." Further I altogether differ from "Sophos," when he lays down that "in planting matters experience is the safest guide." For instance, after nearly a century of coffee planting, experience has not yet taught us which are the best trees to plant for shading purposes: all sorts of deleterious trees are still grown in coffee merely for shade. It is only comparatively recently that Science has stepped in with the discovery that leguminous trees are the only ones that enrich the soil by fixing the nitrogen of the air through bacterial formations on their root system. Again, what has experience by itself taught us about leaf disease? Practically nothing, for we do not up to this know the origin and life history of this disease, nor how to effectually combat it. It is only now that we are promised that "this work will be taken up immediately on a scientific basis." There is hardly any industry so dependent on scientific research as agriculture; and when experience and science are combined in practice, then alone can it be truly said that we have a "safe guide" for the progressive management of our estates.

J. B. LESLIE-ROGERS.

Ootacamund,
5th November, 1916.

The Planters' Chronicle.

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THE U. P. A. S. I.

(INCORPORATED.)

Contents.

The Deputy Director of Agriculture, Planting Districts has left Head Quarters on an extended tour through the Nilgiris, and Wynaad, and attends the Local Branch of the Rubber Growers' Association at Cochin on the 25th instant at which the Secretary U. P. A. S. I. will also be present. Both hope to return to Bangalore about the 27th. The former has furnished us with an article on Citrate Soluble Phosphoric Acid.

We publish at the request of the Director, Labour Department information about his Department and some extracts from the *Times of Ceylon* bearing on Labour Legislation.

We also publish an extract from *Tropical Life* dealing with Coffee Planting for Profit. Many of the Books and Pamphlets are doubtless well known to Coffee Planters. The promised publications will probably contain many useful suggestions.

In our Correspondence columns will be found a letter from Sophos commenting on Mr. Leslie Roger's last letter. We do not hold ourselves responsible for the opinions of our correspondent: but infer that he can champion them himself.

We publish a generous offer to bear the expenses of Photographs illustrating contribution papers from the Imperial Department of Agriculture in India.

We have been asked to insert the following, which we do with pleasure.

"The many friends of Mr. R. deRoos Norman the Manager of the Cochin Rubber Co., Ltd., Trichur who was recently ordered home for a cancer operation which was quite successful and that the patient is now out of danger."

Owing to the lateness of the incoming mail our usual article on Markets, Prices and Statistics cannot appear this week.

SOUTH INDIA PLANTERS' WAR FUND.

	Rs.	A.	P.
Amount previously acknowledged	54,323	1	11
Mr. W. A. Lee	40	0	0
Total...	54,363	1	11

CITRATE SOLUBLE PHOSPHORIC ACID.

An interesting series of articles are appearing in the *Indian Planters' Gazette* on the subject of "Soil Fertility and Crop Production." In the course of discussing the chemical analysis of soils the author says:—

"For some time research chemists have tried different solvents to estimate the amount of constituents immediately available to the plant. Dr. Bernard Dyer, who made some careful researches, decided that plant roots can dissolve certain substances which water cannot so easily dissolve.

"An experiment is described in Sach's well known work on Botany; a slab of marble was covered with a thin layer of soil; and seed sown in the soil. The soil was kept moistened and the plants grew. After some weeks the soil and plants were washed off the slab and on the surface of the marble was a perfect tracing of the roots of the plants. This shows that the plant roots exuded some acid substance which dissolved the lime from the bright surface of the marble.

"Another experiment was that of Dr. Dyer. He took the roots of some plants, cut them up very finely, reduced them to a pulp, and extracted the sap. He found that the sap was acid and its activity was equal to one per cent. of citric acid. Taking a one per cent. solution of citric acid he tried its solvent power on some soils, known to be deficient in available Potash. The same test was made on soil rich in available phosphoric acid and of another exhausted of phosphoric acid. There was no doubt that one had an abundance of phosphoric acid while the other was exhausted of it, because one had been exhausted for 40 years and the other continually supplied. The one per cent. of citric acid showed the difference between the two soils, therefore, he came to the conclusion that if the soil contains less than '01 per cent. of phosphoric acid soluble in this citric acid solution, it was in need of available phosphoric acid to be supplied in the form of manure, but if it contained more than '01 per cent. it had no need of an application of Phosphoric acid. By further reasoning he concluded that if a soil contains less than '005 per cent. of potash soluble in this citric acid solution it needed potassic manure supplied to it; but if it did not have less than that quantity it was not in need of potassic manure. His process is generally used in order to determine "available phosphoric acid" and "available potash."

The exact mechanism of this power of roots to dissolve salts is not clearly understood. It may be that they actually exude a dilute organic acid, or it may be that they give off Carbonic Acid gas which, being dissolved in the soil water, causes the acidity of this in the immediate neighbourhood of the root hairs to be more concentrated than the average soil water and thus exert a local increased solvent power. Again the actual quantities of "available" Phosphoric acid and Potash laid down by Dyer as a minimum for soil fertility probably need some modification when applied to soils under tropical conditions.

However this may be Dyer's method has been adopted as the standard one for determining the "available" plant food in a soil by English Chemists, the American Agricultural Chemists favour a dilute solution of Nitric Acid. Either method is arbitrary, but it gives a fair idea of the amount of food available to the plant and acts as a good working basis for manurial treatment.

Wagner introduced a similar method for determining the available phosphoric acid in insoluble phosphates, using a two per cent. solution of Citric Acid. This is again an arbitrary method but it has given good results.

The beneficial effect of the phosphoric acid in finely ground steamed bone meal is unquestioned, and though little of it is soluble in water, a citric acid solution will dissolve from it 12 to 31% of phosphoric acid depending on the temperatures of the solution and the time of extraction. Excellent results again have been obtained by the use of Basic Slag and these results are commensurate with the amount of citric soluble phosphoric acid present. It has therefore become customary to regard the citric soluble phosphoric acid in phosphatic fertilisers as having a commercial value nearly equal to that of water soluble phosphate. The increasing demand for phosphatic fertilisers has lead to a search for substances previously considered of little value for this purpose, and, especially in America, rock phosphates have been recommended as fertilisers. Such materials have a low solubility in Citric acid and so it has been assumed that their value is less than that of high grade Basic Slags. In America such rock phosphates are often obtainable very cheaply in comparison with Basic Slag and Superphosphates, and when ground to a very fine powder, on the basis of equal money value they give more favourable results on some soils than acid phosphates. They require a soil containing plenty of organic matter to generate a comparatively strong solution of Carbonic acid in the soil water in which they must be dissolved before becoming available to the plant. For the same reason their action is facilitated by the incorporation with the soil of green manures, and the use of Sulphate of Ammonia as a source of Nitrogen. The fineness with which they are ground is an important factor and their action is in any case slow though it may be more rapid than was at one time supposed. If applied in large quantities they are undoubtedly useful as a permanent improvement though smaller quantities of more soluble phosphates give better immediate results, and, when applied at intervals, are in the end more profitable. In fact on the majority of soils rock phosphates form an ineffectual source of phosphoric acid.

The study of these rock phosphates has led of recent years to a good deal of controversy as to the validity of the citric solubility as a measure of the value of Basic Slag as a fertiliser.

During the years 1911-13 five experiment Stations co-operating under the auspices, sad to say, of the Union of German Experiment Stations were with one exception unanimous in upholding the validity of the citrate test. Similar, though less comprehensive, tests carried out during the past three years in England under the auspices of the Agricultural Education Association have also given results which in the main bear out this conclusion, and show that the Fertilisers and Feeding Stuffs Act in England is justified in officially recognising the Wagner method of valuing Basic Slag and similar phosphatic fertilisers, and that there are no grounds for d[illegible]rting from this customary method of valuation.

The most important constituent of Basic Slag is undoubtedly the phosphoric acid, but Slags contain a number of other constituents, some of which appear to have a fertilising value. There seems reason to suppose that a balance of the secondary constituents is necessary, that is medium proportions of magnesia, manganese, iron etc. are all useful, but extra large proportions harmful. The citric acid solubility of Slags is correlated with the constituents of the Slags in such a manner that it may form a useful test of their value provided always that its purely arbitrary and conventional character is recognised.

RUDOLPH D. ANSTEAD,

Deputy Director of Agriculture, Planting Districts.

U. P. A. S. I. LABOUR DEPARTMENT.

At the request of the Director of the Labour Department we publish the following:—

Mr. Waddington has been in charge of the Coimbatore office as Deputy Director of the Labour Department since November 1916 and will continue as such.

Mr. F. W. Winterbotham will be the Superintendent of the Labour Department at Mangalore, South Canara, from the 1st December, 1916.

Subscribers are requested to note that the Director will be on leave and in the most inaccessible place he can find from the 10th to the 31st of December. Routine work will be attended to by his office in Bangalore.

Mr. Clementson will be on leave from 1st to 31st December, during part of which time he will be with the Director in his hidden fastness. His office at Srivilliputtur will carry on routine work during his absence.

All offices of the Labour Department will be closed for the Gazetted holidays for Christmas and the New Year.

Subscribers of the Labour Department are asked to note that there is no office at Markapur. The present headquarters of Mr. W. A. Walton is MADANAPALLE and his Registered abbreviated telegraphic address is "Upasi" "Madanapalle."

Labour Legislation.

We publish elsewhere an interesting letter from a former Ceylon planter now in the Federated Malay States in which he gives a graphic description of labour evils in that country, some of which he attributes to the excessively paternal attitude of the Government towards the immigrant cooly. It is, of course, no use trying to burk the possibility that new legislation dealing with labour which may be introduced may include provisions which planters did not seek and may not relish; but it would be a great mistake to think that undesirable legislation can be avoided altogether by planters not approaching Government and adopting the policy of the ostrich by ignoring present evils. The best chance planters have of being able to shape future legislation is by taking the initiative, not by allowing others to do so. If planters had asked for the compulsory abolition of advances ten years ago the probability is that the one blot on our present labour system, the advance evil, would have been solved by this time, and Government would have little excuse and less inclination to interfere with the existing system. Views on the labour question are too often based on the assumption that if planters themselves shut their eyes to evils, everybody else will do so, whereas the fact is that, in the first place, the Government of India is exhibiting an increasingly close and paternal interest in all that pertains to the welfare of the Indian labourer, while, secondly, there are non-official bodies in existence whose sole aim is to create an impossible state of relations between employer and cooly in the supposed interests of the latter. However, it is clear from our correspondent's recital of grievances that the main evils of which the F. M. S. planters have to complain are due to acts of omission rather than of commission by the F. M. S. Government. It is doubtless the reverse of pleasant to the Straits planter and not altogether good for the cooly, for the latter to spend his money on rickshaws, to exhibit less and less affection for hard work and more and more fastidiousness in the choice of the kind of service he will undertake, but this is the almost inevitable result of increased prosperity among the ignorant, and it will go on up to the point where it will pay the planter to engage other labour. It has more to do with that law of supply and demand which we hear so much of than with the law of the

country. The increase in bolting and notice-giving is a mark of more serious demoralisation among the F. M. S. coolies, and it is useful to us to know that the legislation adopted in the F. M. S. has entirely failed to eradicate these evils. Our correspondent is evidently under the impression that the law enabling coolies to give a month's notice and leave the estate owing money is peculiar to the F. M. S. This is, of course, not so, the only difference between the conditions in the two countries being that when the cooly bolts or gives notice in Ceylon the monetary loss is much larger than it is in similar circumstances in the F.M.S. Incidentally, it may be mentioned that strong pressure is at present being brought to bear both on the local and Home Governments to abolish imprisonment as a penalty for absconding. What the effect of such a measure if passed would be on estates we do not know; but it is clear that it would compel employers for their own protection to regulate the question of advances. The position at present is that there is considerable danger of legislation being introduced as the result of action entirely independent of the planting community altogether and in which the interests of the latter may not be consulted, and it would be wiser to anticipate this than to try ineffectually to prevent it.—*Times of Ceylon.*

Labour in Ceylon and the F. M. S.

Sir,—It is with considerable interest that I see from your weekly issue that a large majority of planters at a record meeting in Kandy have plumped for legislation as against renewed federation. It was inevitable that legislation would come sooner or later, and the pity is that it has not come before. It would have prevented one of the best labour force in the world from getting into its present, hopeless condition and saved the working planter from the continual worry he has had to undergo in the last few years, never knowing to-day that he is not going to lose half his labour force to-morrow in order to put money into the hands of the rascally kangany or chetty. No federation scheme brought forward in the past has ever been of any use, and no federation scheme ever will be in the future for the simple reason that planters never can or will combine, and there is always some way by which every rule can be evaded by those who wish to do so.

But from the tone of some of the letters that have appeared in your paper the last few months and from some of the remarks made by you in your leading articles, one might infer that with regard to Tamil labour in the F. M. S. "everything in the garden is lovely." It is far from it. The Tamil cooly in this country is pampered by a Government and by labour laws which have taught him to consider himself as good as or better than his dorai. In every district there is what is known as the Immigration Department, and if a cooly has any grievance against his dorai he goes to the nearest Immigration Department and makes a complaint to what he calls the "Sunjai Dorai." He hasn't generally got to go very far. One of the Immigration officials visits every estate periodically and interviews the coolies to see if they have got any grievances, and also inspects your big check-roll. Should he see such a thing as a fine entered in the check-roll you will be made to refund the amount to the cooly.

Most of the present labour rules were brought into force by your present Governor when he was here. So, 'ware, you Ceylon planters when you agitate for legislation. What you say is true—coolies do save money over here, and they do remit money to the coast, and the labour out-turn here is certainly better, generally about 90 per cent., but the average Straits cooly does not know what a day's work is, as compared to the Ceylon cooly. The tapper has, of course, finished his work for the day by 12 o'clock and goes off to the lines, and the other coolies,

weeders, etc., knock off at 2 o'clock or 2-30 p.m., and even then they have not killed themselves with over-work. The Tamil cooly over here is a swell; he travels about in rickshaws with a cigar or cigarette in his mouth or on a bicycle, and very often in one of the motor cars run by Chinese and plying for hire all over the country at about 5 cents per mile a passenger. If one goes along any of the roads in the chief planting districts at any time in the afternoon or evening one comes across drunken and squabbling coolies the whole way along the road. I have never seen so many coolies the worse for drink in Ceylon as one sees over here. One could never get a cooly out here to carry one's box like one does in Ceylon, and no one would dream of trying to. I can imagine a cooly's look of horror if one asked him to carry a box say the distance of from Maskeliya to Hatton Station.

A large amount of labour certainly is recruited from India, but crimping is rife all over the country and lots of newly-recruited coolies vanish before they have been a month or two months on the estate. I know of one very well known company's estate where at the beginning of 1915 they had a labour force of approximately 1,100 coolies. They recruited during the year 700 coolies, nearly all from the coast, and were left at the end of the year with exactly 100 coolies more than they started with. This is an example of what is quite common all over the country. The cooly is landed free on the estate and the recruiter gets Rs. 10 for every cooly he recruits at the coast. One gives a cooly or kangany going over to the coast to recruit what is known as a "licence to recruit." A big number of the coolies who come over here on a recruiting license are old coolies who come back here to a different estate from what they were on formerly, and after they have been a short time on the new estate bolt back to their old estate, though perhaps not directly, as they may perhaps go to one of the small Chinese estates which abound in this country and from there on. I don't quite know what you mean by a heavy penalty for locally recruited coolies—one can always register any cooly or gang of coolies that come to one's estate from another estate for the large sum of one dollar! The Planters' Association over here have been agitating lately to get this amount increased, but I should doubt Government doing it, as it might hamper the poor cooly, and some Government officials would like to see a cooly free to move from an estate at a day's notice instead of a month's. By the way, all a cooly has to do if he wants to leave your estate is to come and give you a month's notice. He may have been recruited from the coast, and only have been a few weeks on your estate, but he is free to give you notice all the same—the expense the estate has been put to in landing him free and paying the recruiting fee does not matter in the least.

There is one thing about the Ceylon advances; one can always recover them from the on-taking estate, but over here the amount paid out for the newly-recruited coast cooly is simply lost if he chose to either give notice or bolt directly after arrival. [These conditions are, of course, exactly the same in Ceylon.—ED. *T. of C.*] Bolting is on a much bigger scale here than Ceylon and the bolter much harder to catch as he can go to a different district altogether, or say from the F.M.S. to the Straits Settlements under different Government laws.

I am afraid this is rather a long-winded letter, but I hope I have succeeded in showing you that this country is not quite such a paradise of labour as has been indicated recently in your paper.—Yours, &c.,

X. Y. Z.

Federated Malay States, October 5th.—*Times of Ceylon.*

COFFEE.

Coffee-Planting for Profit No. 1.

As we believe, in spite of the enormous output of coffee in Brazil, that the production of the superior growths of this useful and purely tropical crop could be increased within the Empire to the advantage of all concerned —producers. Government collectors of revenue, and consumers—we propose to call attention to the current literature on the subject augmented by our own experience on the industry. By doing so we hope that our readers, by studying the authorities quoted in the original, will be induced to pay more attention to the coffee they already have planted, or if they start its cultivation for the first time, that they will take the trouble to secure the most suitable variety, and the best seed of that kind, and then, having done this, leave no stone unturned to enable this, the best of seed in the ground, to turn out the best of coffee in the cup.

Among the current literature that can be studied with advantage by any coffee man, producer or buyer, are: *The Tea and Coffee Trade Journal*, of 79, Wall Street, New York, edited by our old friend, Mr. Wm. H. Ukers, who includes in his well-known monthly excellent articles on "Coffee-growing," written on the estates in Costa Rica, Salvador, Arabia, Abossinia, Venezuela, Queensland, Mexico, in fact, in every producing centre, and accompanies his descriptions with a liberal number of illustrations that makes them as interesting as they are instructive. Our file of this journal, which covers the last three or four years (less such copies as have been borrowed (?) by its many admirers when visiting our office), leaves but little to be desired as regards general knowledge of the planting and curing of coffee for market.

Then there is *Simmons' Spice Mill*, which we have not yet had the pleasure of meeting, but whose articles we have seen reproduced in the *Planters' Chronicle*, and have, in every case, found them well worth carefully studying.

Handbooks on the subject are but few, we would wish that they were far more numerous. It is their absence that has so often caused us to appeal to our readers interested in coffee cultivation to write a book on the subject and submit it to us with a view of our undertaking its publication. As, however, no one seems in a hurry to, nor, in fact, to show the least sign of accepting our offer, we feel forced to start this series of articles on coffee similar to those that have been and still are running on tobacco planting, and trust that they will meet with an equal share of success, as shown by the letters received concerning the latter. Meanwhile, we hope that our readers will kindly remember that our offer to publish a useful handbook on the cultivation and preparation of the various kinds of coffee for market —C. arabica, C. liberica, C. robusta, C. canephora, Quilon coffee, &c, still holds good, and that when their MS. is ready, if they will forward it to our publishing department a 83-91, Great Titchfield Street, we will do our best to secure its publication.

The books we have got, taking the most ancient first, are: "Coffee Planters' Manual" published by A. M. and J. Ferguson, of the *Ceylon Observer*, Colombo, Ceylon, as far back as 1898. "Coffee Cultivation in Queensland," by Mr. Howard Newport, the instructor in Tropical Agriculture at Cairns. This was published in 1910, and copies (if not out of print) are obtainable from Mr. Anthony James Cumming, Government Printer, William Street, Brisbane, Queensland. Pp. 59, several illustrations. Price not mentioned. "Coffee: its Cultivation and Manuring in South

India," by Rudolph D. Anstead, M.A., Government Planting Expert and Scientifie Officer, Department of Agriculture, Madras. 48 pp. no illustrations. Price 2 annas, or say 4*d.* post free, being *Bulletin* No. 6 of the Department of Agriculture, Bangalore, Mysore State. "Shade in Coffee Culture" by O. F. Cook, Special Agent for Tropical Agriculture of the U. S. Department of Agriculture at Washington, being Bulletin No. 25, and published in 1901.

77 pp. Mp. price mentioned. Many other publications, no doubt, dealing with coffee will pass through our hands and be made use of as we go along, but whenever we do so full acknowledgment will be given ; for, as stated in our opening remarks, what we are really seeking for is to induce our readers to be interested in and to study the original sources of information, as well as following what we may have to say on the subject from time to time.

Coffee Planting for Profit No. II.

Increasing the Home Trade in the United Kingdom.

We would maintain that, with a little encouragement and tactful instruction on the part of those who have the coffee to sell, the consumption of this useful beverage could easily be doubled in the United Kingdom (and even then it would not assume very substantial proportions), and that, too, without disturbing the present consumption of cacao and tea. This increase could also be brought about with direct benefit to our own colonies and dependencies, since it would be due to the middle classes drinking coffee after dinner at home as well as at restaurants, and instead of their pretending that it is no novelty for them to do so it would then become a regular habit. In these days, if people ate less heavy food and rested more by sitting longer over their meals and drinking a cup of harmless stimulant like coffee, we feel that it would be much better for them, provided, of course, that they "worked" and did not drift through life killing time, as some women are inclined to do, just because it is not necessary for them to work for their living, and as if they had not the energy or brains necessary to profitably employ their time on their own initiative. If every man and woman was really occupied throughout the day, they would be only too glad to take an extra ten minute at least once a day at the and of a meal and think out a little whilst mildly stimulating their brains with a cup of choice coffee, Jamaica Blue Mountain, or Mysore, or else a judicious blend of pure coffees, and not a shameless mixture of chicory and coffee. Doing so would certainly tend to lessen the craving for taking stimulants that we are told is on the increase among leisured as well as working women, especally those who have more money to spend and time to spend it than they have been used to enjoy in the past. Smoking cigarettes seems to have come to stay among women, and smoking, we are told, must tend to drinking, not drinking to excess, but just a "wee drappie." Since this is so, all the more reason to encourage the consumption of coffee, so that it can be a "wee drappie" of that stimulant and not of Scotch, Irish, or Cognac.

Once this is realised by sellers of choice coffee, they ought surely to be able, especially if they call the temperance advocates in to help them, to double the present consumption of coffee per head in the United Kingdom in a very short time, and then make it advance another 50 per cent. within a year or so, thereby making the present consumption of about ¾ lb. per head per annum increase first to 1½ lb. and later on to 2 lb. or 2¼ lb. According to Simmons' Spice Mill, England only took 31,000,000 lb. of coffee from Brazil in 1909 (and that does not say that all this went into actual consumption) as compared with 221,000,000 lbs. that went to France,

435,000,000, lbs. to Germany, and no less than 933,000,000 lbs. taken by the U.S.A. In that year we are not told what the consumption of coffee per head was in England, but in 1912 it had only reached the insignificant amount of ·61 lbs. which increased to ·63 lbs. in 1913. Against this Germany consumed 5·66 lb. in 1912, against 6·17 lb. needed by France, whilst, in 1909, Holland received 12·32 lb., Belgium 7·57 lb. and the U. S. A. 9·23 lb. This being so, is it too much to expect that the consumption in the United Kingdom could be increased first to 1 lb., and later on to 2 lb. *per capita* or a little more, owing to the fact that a large number of people habitually sit and think for a few minutes over a cup of choice and harmless British-grown coffee, instead of drinking spirits or other harmful stimulants as was the case before the War brought a change?

We have started this series of articles with these remarks because it is necessary before launching on a new enterprise to look round first for your market, and this being so, we suggest to our readers that they do not look upon the United Kingdom as a "contemptible little consumer," but rather as a wealthy country that has yet to be taught to appreciate the pleasure and profit that lies stowed away in a cup of really good coffee, and then whilst growing a really good variety to send to England to put into the cups, to take steps with other centres to carry on an educational campaign over here to show why coffee is good, and one or two varieties much more preferable to all the others put together. When such steps are taken, then the demand for really good pure coffee is bound to increase over here, and when this comes about, then to enjoy a cigarette after one's meal will no longer tend to lead the smoker to drink spirits, but will add to his enjoyment of a cup of pure coffee and so doubly benefit the planters in the Tropics.—*Tropical Life.*

(*To be continued.*)

Before the war the United States imported annually from Germany as much as 300,000 tons of potash. The failure of this source of supply has induced the Department of Agriculture to make the experiment of extracting potash from kelp. It is believed that the vast beds of this weed off the coast of California will suffice to furnish all the future needs of the country, and large quantities are already being placed on the market from this source. But, according to *California Fish and Game* for July, fears have been expressed that the cutting of the kelp will have an injurious effect upon the fisheries of the State, and this because of the protection afforded by the weed to the beaches, and the danger of exterminating the clams and spiny lobsters which live more or less within the protection of the kelp. They also fear that the young fish, especially barracuda, which are in the habit of seeking refuge here, will be driven away, and further that such fish as spawn here will similarly be destroyed. These several objections have now, however, been carefully examined, and it is pointed out that the kelp-cutters, or reapers, do not cut below 6 ft., thus leaving ample shelter. It may be, indeed, that the cutting will prove actually beneficial, since it will be less easily torn up by storms. The species of kelp which is thus being harvested is *Macrocystis pyrifera*, a plant which ranges in length from 100 to 300 ft.—*Nature.*

CORRESPONDENCE.

Leaf Disease and Defective Cultivation.

To

The Editor of the *Planters' Chronicle.*

Sir,—I have read Mr. Leslie Rogers' letter under the above heading in your issue of 28th October, and I reply to his remarks seriatim.

He now withdraws from his previous contention that "loss of vitality was the cause of leaf disease;" but says "it is the chief factor in attracting and spreading the disease." I am still unable to follow him. Although leaf disease has been with us for some 50 years, and has received attention from many scientists, many phases of its life-history are still obscure. But any planter can see for himself what happens during the annual attack. After the pest has done its work in any year, the spores lie dormant—just where and how they hibernate has still to be determined. When the following monsoon again renders them active, they attack weak and healthy trees indiscriminately. I am willing to concede that weak trees may suffer greater injury from a 'go' of leaf than healthy ones, and that, as a corollary, the planter's best safeguard in the present state of our knowledge is to keep his coffee in good heart. But the fact that weak trees are injured more by leaf does not make them "the chief factor in attracting and spreading the disease." Does Mr. Rogers contend that an Estate which contained no weak trees would never get leaf; or that, leaf disease having appeared, it would not spread? The fact is that leaf makes no distinction between weak and healthy trees, although the ultimate effect may be worse in the former case than in the latter. Mr. Rogers goes on to say that "faulty and insufficient cultivation results in loss of vitality." Here he begs the question. With him, the man who does not dig and dig often is the man who is guilty of "faulty and insufficient cultivation"; but many planters have proved by actual experience, and beyond any doubt, that in the case of coffee to discard digging does *not* result in loss of vitality. To cite my own tote as an example. I gave up digging when Dr. Lehmann declared against it. I forget just how long ago that was, but it must be a dozen years at least. Since that date neither fork nor mamotie has gone into my tote by way of digging, and my coffee is healthier and in better fettle now than it ever was when I dug systematically every year. Mr. Rogers says he has "made a close study of coffee for over a quarter of a century." But nothing is more calculated to lead a man to false conclusions than a mere academical study of any product—especially coffee; and nothing is more likely to mislead than the assumption that methods which have been proved to be suitable to tea will be equally suitable to coffee. In his first letter Mr. Rogers wrote "an ounce of practical experience is worth a ton of the wisest theories." Precisely so: it is practical experience alone that counts. Mr. Rogers then asks "what happens in an abandoned Estate?," and apparently he places a thoroughly well-worked tote where digging is not practised in the same category as an abandoned tote. The fallacy involved is so obvious that I need not refute it. I will only repeat that many planters have proved beyond the shadow of a doubt that with coffee digging is not only unnecessary but pernicious. Anyone reading Mr. Rogers' remarks under this head would suppose that it is a common practice amongst planters to abandon good coffee, which then—in his opinion—goes out owing to "the sudden cessation of soil aeration and the exhaustion of food supply &c., &c." I need hardly point out that a planter does not abandon coffee

until he is convinced it is past redemption; and moribund coffee of this kind needs little if any extraneous impulse to make it give up the ghost. I can only recall one instance in which really good coffee was wantonly abandoned, and it is unique. When the gold boom of the early eighties convulsed S. E. Wynaad, all the fine coffee properties round Devala, Pundalur, and Cherambadi fell into the clutches of the mining Companies, who in most cases promptly abandoned the cultivation, and in the rest made only a pretence of keeping it up for a year or so. And what happened? It did not succumb owing to "sudden cessation of soil aeration" or "exhaustion of food supply." In a very short time the whole area became one sea of dhubbay grass: this turned as dry as tinder in the hot weather: fire got in when the hills were burnt according to the annual custom: and in a twinkling thousands of acres of glorious coffee went up in one mighty holocaust. If Mr. Rogers could prove, and not merely assume, that a well conducted tote *sans* digging is in the same position as an abandoned tote, his remarks might be pertinent: as it is, they are pointless, for the evidence is all the other way. Mr. Rogers says he "has carried out experiments which have perforce compelled him to come to certain conclusions." May I suggest that he should give us full details of these experiments—how and on what Estate they were conducted; who supervised them; how long they continued; and exactly what results were obtained? If they proved so conclusively that digging is essential to the well being of coffee, they would help his contention far more effectively than the quotations from obsolete books with which he concludes his letter. It will be sufficient to point out that all these extracts (save the last, and Sir G. Watt was not a practical planter) are antiquated—antiquated in the sense that these opinions were expressed when digging was universally accepted as correct, and before planters, acting on Dr. Lehmann's advice, discovered that it was—to repeat the words I have used before—not only unnecessary but pernicious. The citation of Arnold as an authority on any matter connected with coffee is singularly inept. His story points a useful moral. Mr. Edwin Lester Arnold was for a short time on a tote on the Nelliampathies. Being endowed with an inordinate measure of self-esteem and an overweening sense of his superior abilities, he considered that his short experience of coffee entitled him to pose as an authority. His book, "Coffee: its Cultivation and Profit," was the result. In the main, this book is stolen from Hull, and marred in the stealing. Whenever he launches out into an original remark, he merely betrays his ignorance. *E. g.*:—"When the young planter has got his men together—*twenty*, perhaps, with their allowance of women and children, for the first *two hundred acres* he opens." (The italics are mine). Again:—"The berry should . . . be planted (in the nursery) in its *silver skin or parchment*." (Again the italics are mine). And so on, *ad nauseam*.

After all, this discussion on the necessity or otherwise of digging is somewhat futile. Since Dr. Lehmann declared against the practice, many planters who dug before have renounced the mamotie and the fork. All these men have ample data, founded on practical experience of both systems (and once more I say that practical experience is the only safe guide) on which to base a comparison between them. It is open to any man who finds his tote did better when dug to dig again. On the other hand, those men who, like myself, have proved conclusively that by giving up digging, and carefully conserving the mulch from shade of the right class, they can keep their coffee in perfect health without any loss of top soil, will be quite unmoved by any resuscitation of ancient theories or any number of quotations from ancient books.

In reply to Mr. Poyser's letter in the same issue, I would say that the non-success of *Erythrina lithosperma* as a shade tree on his Estate must, I think, be attributed rather to low rainfall than to high elevation. My *lithospermas*, which are ideal shade trees, are growing at about 4,000 feet, but then my average rainfall is 90 inches against his 55.

SOPHOS.

No. 1968/3 of 1916.

Imperial Department of Agriculture in India.

From

J. MACKENNA, ESQ., M.A., I.C.S.,

Agricultural Adviser to the Government of India.

To

THE SECRETARY,

United Planters' Association of Southern India, Bangalore.

Dated Pusa, the 10th November, 1916.

Sir,—I have the honour to state that articles received for publication in the Agricultural Journal of India sometimes lack illustrations because the writer has not the services of a photographer at his disposal. It has also been found that in some cases interesting results have not been sent to us for publication because on paper they would look bald and unconvincing without photographs. In order to remedy this state of things I have arranged that the cost of taking photographs for illustrating the contributors' papers will be paid by this office when private photographers have been engaged for the purpose. I beg therefore to request that you will be so good as to circulate this letter to the members of your Association and also make it known that we shall be glad to publish in the Agricultural Journal of India any suitable articles contributed by them.

I have the honour to be,

Sir,

Your most obedient servant,

J. MACKENNA,

Agricultural Adviser to the Government of India.

The Planters' Chronicle.

RECOGNISED AS THE OFFICIAL ORGAN OF THE U. P. A. S. I., INCORPORATED.

(Secretary's Registered Telegraphic Address "Planting," Bangalore.)

VOL. XI. No. 48.] NOVEMBER 25, 1916. [PRICE AS. 8.

THE U. P. A. S. I.

(INCORPORATED.)

Contents.

We publish a Modified Method of Green Manuring extracted from the Agricultural Research Institute, Pusa, Bulletin No. 63.

As the abolition of indentured labour is a political question that is bound to be shortly settled, and bearing as it does on the whole position of Labour in Southern India, we publish from the *Madras Mail* the concluding portion of the Government Despatch published in the Gazette of India. The proposed abolition is of far wider significance than mere local conditions.

With the Meeting of the Local Branch of the Rubber Growers' Association at Cochin, on the 25th instant, where many subjects of interest affecting the cultivation of Rubber will be discussed, the extracts we make from the *Indian Rubber Journal* are appropriate and timely. The spread of the various diseases incidental to Rubber growing emphasises the necessity of a universal Pest Act, and the contention "that we are not training sufficient men to deal with pests and diseases, neither are we providing the necessary funds for such work."

It was hoped that Mr. Marsden, Scientific Officer, Ceylon, would have been able to attend the meeting, but pressure of work prevents him doing so. Leaving the war out of the question have we, or are we, training sufficient men to fill the responsible posts ?

In accordance with the Resolution passed at the Annual Meeting of the U. P. A. S. I., a list of Books dealing with our Industries is published.

A summary of a Bulletin by Mr. G. R. Bryce on Nodules on Hevea is published.

SOUTH INDIA PLANTERS' WAR FUND.

	Rs.	A.	P.
Amount previously acknowledged	54,363	1	11
Mr. G. H. Browne	120	0	0
Mr. H. Waddington	60	0	0
Total...	54,543	1	11

SOIL.

A Modified Method of Green Manuring.

In a previous Bulletin of this Institute a suggestion was made that green crops instead of being ploughed or buried by other methods directly in the soil on which they had been grown, should first be treated in such a way as to bring them into a more suitable condition for use as manure. This suggestion was based upon experimental results obtained mainly in the laboratory and as it has now been supported, and the conclusions upon which it depended have been confirmed by field results as well as by further laboratory work, it is here proposed to give some account of the method and of such results as have been obtained up to the present. It should, however, be clearly understood that the writer's principal object in publishing is to invite criticism and suggestions as to the practicability of the method and the possibility of its application to various crops (not necessarily grown as green manures), from agricultural officers throughout India, whose experience as practical agriculturists will enable them to decide as to the possible applications of the method in their own districts and to make such modifications as particular cases may require.

Principles of the method.—It was found by laboratory and field experiments, as recorded in the above-mentioned Bulletin, that the complete decomposition of a green crop depended upon the incidence of the rainfall following its burial; this being frequently defective, it is proposed to avoid negative results from green-manuring by carrying out the initial stages of decomposition under artificial conditions. It is here assumed that a negative result will be obtained from green-manuring if decomposition does not proceed in such a way and to such a degree as to result in the conversion of the organic nitrogen of the green manure into nitrate, (or in the case of certain crops, such as rice, into ammonia) and the breaking down of the cellulose and lignified tissues so as to result in the addition of humus to the supply already present in the soil. Failing such complete decomposition the buried crop will mainly contribute to that inert organic fraction which plays a comparatively unimportant part in the life of the soil, as compared with the active portion furnishing food for bacteria, fungi, and plants and profoundly modifying its physical character. It was found that the most complete breaking down and subsequent nitrification of the plant tissues was obtained by providing an excess of moisture accompanied by anaerobic conditions during the first stage, followed by a second one of less moisture and semi-anaerobic conditions. It is to be understood that complete anaerobism is not attained nor aimed at, but only a condition favourable to the development of that class of organisms whose specific function is the breaking down of the cellulose walls and middle lamella, the resistance of which to decay under aerobic conditions indefinitely prolongs the decomposition of buried green manures and organic residues in a soil containing an insufficiency of moisture.

One of the advantages connected with Indigo culture is the use as manure of the by-product of manufacture locally known as *seel*; this is the indigo plant partly fermented in water during extraction in the factory and partly in heaps after removal from the vat. The resulting product is a partly decomposed mass of vegetable tissue which possesses high manurial value, although in cases where it is taken direct from the factory to the land this does not show its greatest effect until the following season whereas when allowed to remain in heaps for a further period of several months its action is rapid and immediate. This different effect is partly due to more complete decomposition and partly to the formation of toxic bodies during

the early stages of fermentation which are decomposed by oxidation at a later period. Here we have then a case where a leguminous green manure is carried through the earlier stages of decomposition under artificial conditions which provide the necessary supply of water and the semi-anaerobism required. It is obvious that any green crop treated in a similar manner may give results which will compare with those produced by indigo *seet* in proportion to their relative nitrogen content, so far as this element is responsible for beneficial results. It must be remenbered, however, that the benefits of green-manuring are by no means confined to the provision of nitrogenous food, but that they also depend upon the production of humus in the state above referred to, so that many crops of low nitrogen content may advantageously be treated in such a way as to attain this condition. Comparatively few have been experimented in other parts of India, that this description of the method is being put forward.

Sann hemp (Sannai, *Crotalaria juncea*) is the most commonly used green manure in North Bihar. When turned in in the ordinary way with the plough its effect on the succeeding *rabi* crop depends upon the incidence of the rainfall. It is always necessary to cut it down before attaining its full growth and to allow a considerable period of time between burying and planting the *rabi* crop. This is necessitated by the possible lack of moisture in the soil during the decomposition period between burying and planting of the succeeding *rabi* crop partly due to the large amount removed by the crop itself by transpiration, and by the difficult decomposition of the more mature crops. It will be seen by reference to the Bulletin (*loc. cit*) that the amount of nitrogen per acre added to the soil by burying sann hemp is greater in the case of the ten weeks old plant as compared with that of six weeks growth in about the ratio of 88 to 69, so that a proportionate loss of nitrogen added to the soil in this form results from early burial. Similarly, a total loss of green manure crop in the proportion of 58 in the ten weeks to 45 in the six weeks old crop results in the reduction in the amount of humus turned into the soil, when early cutting is resorted to in order to ensure proper decomposition. That such early turning in of the green crop is necessary or at least advisable under ordinary conditions is shown by the relative rates of nitrification of young and of mature plants as described in the Bulletin (*loccit*,) and one of the advantages of the new method lies in the possibility of dealing successfully with a fully matured and consequently heavier crop.

The method.—Borrow pits were dug at the sides of the field previous to cutting the green crop; this being done during the rains the pits filled with water; the cut crop was placed in the pits, left there for periods varied experimentally from 24 to 48 hours, removed from the pits, stacked in heaps and allowed to ferment for varying periods of time, after which the rotted manure was applied to the soil.

It was at first found necessary to water the heaps occasionally to prevent drying out, but this was subsequently avoided by plastering their outsides with clay, comparatively small quantities of water being occasionally applied to prevent cracking of the latter.

Further modifications of this method were adopted subsequently; in order to avoid loss of nitrogen as ammonia, the water remaining in the pits was used for moistening the heaps, and the soil at the bottom of the pits was dug out and made into alternate layers with the green manure in the heaps. As large quantities of ammonia pass into the water during fermentation the smallest possible quantity of water should be used so as to make it possible to utilise the whole of it for moistening the heaps.

It was found that more complete fermentation could be obtained by inoculating the heaps with impure cultures of cellulose destroying bacteria obtained simply by making a water extract of fresh cowdung.

It will be seen from the above description of the method that its main object is to obtain more complete decomposition of the organic matter than can be arrived at by the ordinary process of burying, this result being achieved by introducing anaerobic conditions in the early stages. Variations of the method should be made to suit local conditions merely keeping the general principle in view in so doing.

It appears to the writer that certain advantages are connected with the use of this method as compared with the ordinary practice, and that they may in many cases more than balance the extra cost of the labour required for carrying it out.

Advantages of the Method.—The principal advantage of the method, as tested at Pusa, has been the immediate return from the green manure treated in this manner, as compared with that from sann hemp buried in the ordinary way. In some cases during the first season of trial this result was not so marked owing to want of complete knowledge of the various factors underlying the action of the material produced; thus, too long soaking in water in some cases resulted in loss of nitrogen as ammonia, and too early use of the manure, combined with inappropriate methods of burying it in the soil, failed to secure freedom from toxins formed during fermentation and inimical to nitrification and fertility. In such cases fertilising action was delayed in the same manner as occurs when fresh indigo *seet* is used injudiciously, the full return from the nitrogen applied not becoming apparent in the *rabi* crop, but in following the *kharif* one or even in the succeeding *rabi* of the following season. This is a not uncommon result of the use of indigo *seet* and is generally looked for in the case of green manure, although in the writer's experience it is not uncommon for the latter to fail entirely to show any positive result if the rainfall is unsuitably distributed or in defect. With properly fermented green manure applied at the right time positive results will be obtained provided the soil moisture is sufficient to supply the needs of the extra growth following from its use.

The immediate action of fermented sann hemp was shown in experimental plots of 1/24th of an acre sown with oats. Here the fermented manure was concentrated by application to half the area on which it was grown. Such concentration forms part of the method and constitutes one of its advantages, and will be discussed separately.

The resulting figures were :—

Treatment.	Grain.	Straw.	
Control	885	2,820	lb. per acre.
Sann hemp	960	2,835	
Fermented sann hemp ...	1,540	2,970	

The control area was not completely unmanured as it had the advantage of retaining the roots and stubble of the crop of sann hemp which was grown on it and used after fermentation to add to that on the fermented manure plot.

This experiment was repeated in the following season both with oats and tobacco, but in this case the results were modified by the fact that the amount of soil moisture present varied from an optimum amount in the plots forming one row at the north end of the field down to a quantity obviously insufficient for full growth at the south end. The plots were arranged in triplicate in three rows running east and west, so that, in the north row the moisture was good, in the middle row it was slightly in defect,

and in the south row decidedly so. The results varied in accordance with this difference. In the north row there was but little difference in crop between the plots which had sann hemp buried and sann hemp fermented, the moisture present being sufficient to ensure decomposition of the green manure, whereas in the south row the fermented manure produced a considerably higher return than the buried green crop.

An experiment on qualitative lines was carried out by the Imperial Agriculturist at Pusa buring the *rabi* season 1915-16. In this experiment mustard stalks were fermented and applied to land on which a very large crop of oats was afterwards obtained. This is an example of the use of a crop other than a leguminous one for this purpose, and Mr. Milligan is of opinion that there are other cases such as sugarcane stools, and Arhar (*Cajanus indicus*) leaves, in which the method may be applied with advantage.

An experiment on tobacco manuring was carried out in 1915-16 with fermented sann hemp in order to determine the effects of different methods of preparation and of application of this material.

Preparation.—Two methods of preparation were adopted :—

(1) *Aerobic*, in which the green manure was fermented in heaps kept moist but not covered with clay.

(2) *Anaerobic*, in which the heaps were plastered with clay.

The sann hemp was first cut into short lengths and soaked in water in a a pit for 24 hours. It was then removed from the pit and transferred to another shallow one, in this case about one foot deep and eight feet square.

Aerobic fermentation.—In this method the soaked material was arranged in alternate layers of *sann* and soil, the former about 3 inches and the latter about $\frac{1}{2}$ inch in thickness. The whole heap was then covered with a layer of soil about 3 inches thick and finally with one of straw to prevent evaporation. Watering was carried out about once a week, sufficient water being added to keep the top layer moist.

Anaerobic fermentation.—The heaps were arranged in the same way, but each layer was consolidated by treading down, and the whole heap was finally plastered with clay about one inch thick.

Fermentation was carried on from 15th August to 5th October, 1915 (about 48 days), after which the heaps were opened up and the fermented material transferred direct to the soil of the experimental plots.

Application.—The preparation of the fermented manure was not carried out in time to allow of its application to the soil sufficiently early to entirely avoid toxic effects. Two methods of application were adopted in order further to test the existence of toxins in the anaerobically prepared material.

(*a*) In these plots the manure was buried in furrows, the plants being placed in intervening ridges.

(*b*) In these the manure was buried in the ridges, the plants being in the furrows.

The fermented manure was applied at rates which represented concentrations of 3 : 1 in one series and 6 : 1 in the other, *i. e.*, the amount used on one acre was prepared from the green manure crop cut from three acres in the first and from six acres in the second.—*Agricultural Research Institute, Pusa.*

(*To be continued.*)

INDENTURED EMIGRATION.

Proposed Abolition.

GOVERNMENT DESPATCH.

Delhi, 18th November.—The *Gazette of India* publishes this morning a despatch from the Government of India to His Majesty's Secretary of State for India, dated the 15th October, 1915, of which the following is the concluding portion :—

In his despatch of the 3rd January, 1913, Lord Crewe stated that the Indian National sentiment against the stigma laid on the race by the existence of the indentured system ignored the advantages to the labourers themselves. We have attempted to show that the economic advantage gained by the coolie while actually serving under indenture is not so great as is often supposed, and that the real benefit which he gains from emigration arises after the close of his indenture period, from the opportunities then before him, of purchasing or leasing land or setting up in business and making himself a position as a settler. But whatever may be the extent of the economic advantage arising from the emigration of indentured labour, the political aspect of the question is such that no one, who has at heart the interests of British Rule in India, can afford to neglect. It is one of the most prominent subjects in Indian political life to-day, and its discussion arouses more bitterness perhaps than that of any other outstanding question, for Indian politicians, moderate and extreme alike, consider that the existence of this system, which they do not hesitate to call by the name of slavery, brands their whole race in the eyes of the British Colonial Empire with the stigma of helotry. How, they ask, will a European colonial ever admit us into the fellowship of citizens of the Empire when he knows that men of our country and colour can be purchased for five years for 5s. a week? It is firmly believed also in this country, and it would appear, not without grave reason, that the women emigrants allow often living a life of immorality in which their persons are, by reason of pecuniary temptation or official pressure, at the free disposition of their fellow recruits and even of the subordinate managing staff. The feelings which these beliefs engender are strong. As far back as 1910 when moving a resolution in favour of the aboltion of indentured labour in Natal, the late Mr. Gokhale mentioned the unanimous feeling of his party and of Indians in South Africa that indenture should be abolished everywhere. A further debate on the general question took place in 1912 when the resolution brought forward by the same gentleman, though defeated, had the support of every Indian member of the Imperial Council.

It is unnecessary here to trace the arguments brought forward in the mover's eloquent speech, which are recorded in the debates of the Imperial Council, and are still used by Indian editors and politicians. The Government speakers on the other side admitted the existence of certain abuses, which, it was believed, could be largely remedied, but pressed the economic advantage to the coolie emigrants and denied that the indentured system could rightly be entitled slavery. Indian public opinion has strengthened and grown more articulate since the debate of 1912. While the favourable impression, created on our minds by Lord Sanderson's report on which our defence of the system in 1912 was mainly based, has been considerably qualified, as has been indicated in the earlier paragraphs of this despatch by the information which has subsequently been elicited by Messrs. McNeill and Chimman Lal. On receipt of Messrs. McNeill and

Chimman Lal's report, we invited the opinions of Local Governments on its recommendations and on the general question whether indentured emigration to the colonies should be continued. The greater number of the Governments consulted have submitted their opinions, and we append copies of the letters.

Although the report favoured the continuance of indentured emigration, while its recommendations referred only to the measures necessary for improving that system, it is noteworthy that the opinions of the Governments of the United Provinces, Madras and the Central Provinces (that of the latter Government conveyed in a memorandum by Sir Benjamin Robertson, the Chief Commissioner), which provide, practically speaking, all the indentured recruits that emigrate to the colonies to which this despatch relates, unanimously testify to the necessity of putting an end to indentured emigration altogether. The opinion of the Assam administration is much to the same effect, in that they suggest the replacing of indentured emigration by a system of State-aided but presumably free emigration. The Bombay Government have no very decided views on the maintenance of indentured emigration, however directly concerning them, as the Bombay Presidency sends, practically speaking, no emigrants to the colonies. We have still to receive reports from certain other provinces. These, however, have little immediate concern with the question, and there are strong reasons for indicating our own attitude on this urgent and important question without further delay.

The feeling in India against indentured emigration has, in no way, diminished since the discussions of 1912, but has, indeed, gained force owing to the labour troubles in South Africa two years ago. We would also again point out that now that we have abolished in India what was considered by a large section of the intelligent public to be an abuse, it is becoming increasingly difficult for us to defend the retention of a similar system for the benefit of the colonies. We are of opinion that the moment has now arrived to urge His Majesty's Government to assent to the total abolition of the system of Indian indentured labour in the four British colonies where it still prevails and in Surinan, and thus to remove a social stigma which is deeply resented by educated public opinion in India, and exposes to hostile criticism the Government of India and His Majesty's Government, in the sanction which they lend to a system entailing much unhappiness and moral degradation among certain classes of a population dependent on their care and protection. We can still understand that His Majesty's Government with their heavy pre-occupation during the course of the war, may prefer to postpone the final settlement of the question till after the conclusion of the war, but in the meantime to facilitate the preliminary discussion, which will have to be undertaken with the colonies interested, we desire to submit the following preliminary suggestion on the general outlines of a scheme, which, in our opinion, affords the most hopeful solution of the difficulties, which we have pointed out, while causing as little disturbance to colonial interests as is compared with the maintenance of our obligation to the classes of the Indian population concerned.

It is quite clear that the mere abolition of indentured emigration, a course which implies the refusal to allow any emigrant to leave the country under a contract, will not be sufficient. The result of this would be that recruiters would induce coolies to go without any agreement, but by the grant of advances or by fraud, and the coolies on their arrival in the colony would be wholly at the mercy of its laws and might be compelled to work out the

advance, which they had received or were alleged to have received, by local labour laws, with which the Government of India would have greatly weakened their power of interference. The mere abolition of indentured emigration, while it would remove what is in India considered a racial stigma, would not do away with the morally undesirable features of coolie life in the colonies or with the abuses of contract recruiting in India, and yet these are stains from which British administration in India ought to cleanse itself. The introduction of a system of recruitment on Sirdari or Kangani lines would, we admit, present difficulties in the case of distant colonies. It would be costly to arrange for the continuous voyage under the conditions, of small parties of coolies, and the system must, in any case, be freed from the bonds which the receipt of advances and the Ceylon Enticement Law attach to the Kangani system. We think, however, that such difficulties can, and should, be met. One of the best features of the last mentioned system is the possibility which it holds out of improving the present abnormal sex ratio with its attendant evils, the removal of which is, in our opinion, an absolutely essential condition of whatever new system be introduced in the place of indentured emigration. The system might be financed by the colonies through a tax on coolie cultivated estates or coolie product exports. There is no need for the individual planter to pay for the individual coolie, and so be led to consider that he has a right of property in him. The coolie should be at liberty to serve whatever master he chose, while if he desired to return to India he would be called on to pay some share of the cost of his repatriation, a share which might vary with the nature of the circumstances and with the length of time he had served. The prospects of free emigration are, at present, very hopeful, except so far as the Mauritius figures are concerned. The figures for free labour emigration during the past three years have been as under :—

1911-12.—British Guiana 19, Jamaica *nil*, Trinidad 62, Fiji 16, Mauritius *nil*.

1912-13.—British Guiana 6, Jamaica 2, Trinidad 48, Fiji 54, Mauritius 840.

1913-14.—British Guiana 4, Jamaica *nil*, Trinidad 49, Fiji 83, Mauritius 794.

It would appear, then, on the whole, that an improved Kangani system under which a coolie was not bound by the receipt of advances or by the local law to serve on a particular estate, with a proper sex ratio, and confined to approved colonies, offers the most promising results. The present system of inspection, shipping and sanitary regulations would have to be maintained. There is no doubt that the change, especially the insistence on a proper sex ratio, would lead, at any rate at first, to a considerable falling off in the number of emigrants but after all it is not the duty of the Government of India to provide coolies for the colonies, but to insist that those who go there shall do so under conditions which are not repellent to educated Indian opinion, and which give the emigrant himself a chance to live a decent life under proper conditions, and to develop into a more desirable class of settler than the man who at present leaves the coolie barracks of Fiji Sugar Estates at the expiry of his period of indenture. By a policy on these lines India will surely offer a more acceptable contribution to the cause of Imperial progress and unity than by a blind compliance with demands for the continuance of an evil system.—*The Madras Mail.*

RUBBER.

Diseases and Rubber Crops.

We do not think anyone conversant with plant sanitation in the tropics can say they are in any way satisfied with the present position of affairs. Every report from the East indicates that not only is canker existent over considerable acreages, but that fomes, pink disease, and ustulina, together with white ants, are taking their toll on an unwholesome scale. Canker on the stem means stopping tapping; pink disease means the same or malformation, and the root diseases usually entail entire destruction of the trees affected. The white ant pest is the only one which shows signs of abating; this is a natural consequence of the disappearance of timber from most properties. We have, nevertheless, no hesitation in stating that diseases caused by fungi are on the increase, and that if more prompt measures are not taken the plantations will be thinned out to an extent and in a manner most undesirable.

We do not wish to scare anyone, but we are satisfied that the present methods are not effective, and that if improvement is not shown at an early date there will be serious financial loss to face. We know the difficulties in the way consequent on the increased acreage to be tapped, the lessened supply of coolies, the inadequate staff of European managers (especially in British possessions), and the impossible task set before a mere handful of mycologists and entomologists. All must realise that diseases increase at an alarming rate if not persistently fought, and that the longer such work is delayed on any one estate the more they flourish on the neglected property, and also on neighbouring plantations.

Legal steps are taken against any person found guilty of importing affected seeds or plants, but we have yet to learn of similar action being taken against planters who refuse to fight plant diseases until all the trees are being tapped. Crop is essential, but we can readily conceive of conditions under which insistence on harvesting may mean disaster. It is obviously sheer folly to refuse labour and supervision for the suppression of diseases which will kill the trees, on the excuse that crop for the time being has first call on all labour.

The conditions necessary for the rapid spreading of diseases among animals are recognised among all Europeans, and no wise person would ever dare to suggest that the out-turn of manufactured goods must be kept up irrespective of the health of labour. In those parts of the tropics where Hevea is being cultivated the conditions are growing more unhealthy, for the rubber trees, day by day. Where one tree was affected a year ago many are attacked to-day. Old trees have been tapped continuously, and their energy is being used up in the production of renewed bark, as well as healing wounds caused by pests, diseases and bad tapping. Old plantations are becoming still more overcrowded, and young properties which a couple of years ago admitted plenty of light and air are now densely shaded. Acreages have been increased, and vast areas, without a break, are under the same cultivation—Hevea brasiliensis. The larger the acreage under the same product the more favourable become the conditions for the spread of diseases common to that particular plant.

Our contention is that we are not training sufficient men to deal with pests and diseases, neither are we providing the necessary funds for such work. It is no part of the duty of a chemist to attend to fomes, and we do not attach any blame to the few experts in plant sanitation for the present state of affairs. We want more money to be devoted to the training of scientific officers to deal with pests and diseases. We see no reason why one disease alone should not occupy the

whole time of special officers in different districts. More marked specialisation would lead to better work. We are quite convinced that ustulina—the latest root disease to compete with fomes—would take up the time of many mycolgists in India, Ceylon, Malaya, Sumatra and Java. Canker on the stem, fomes, pink disease, die-back, and each of the other very serious diseases, call for similar specialisation. We are quite aware that some directors, not gifted with foresight or intelligence, will oppose our suggestion on the ground of expense. In fact, we know many who regard all such work as scientific amusement, and who fail to grasp the enormous change effected by the establishment of huge contiguous areas of Hevea, and the favourable environment which such tracts offer to serious pests and diseases. We would most strongly urge all opponents to study the steps which have been found necessary with coffee, tea, and cocoanuts—cultivations which are not on the same footing individually as the rubber plantation industry.—*The India-Rubber Journal.*

Synthetic Rubber.

Even if a synthetic body were obtained which could be said to compare favourably with the natural article, the price would obviously become a determining factor in the chance of success; it is here that an industrial process would encounter almost insuperable difficulties. At the time when chemists began to turn their attention towards synthetic rubber he price of this commodity was abnormally high, reaching as much as 12*s.* 6*d.* per lb. in 1910. Since then, however, there has been a steady fall, reaching as low as 2*s.* 4*d.* per lb. in 1915. This is accounted for by the plantations coming into bearing, the products thereof occupying a very prominent place in the world's markets. The recent growth of the plantation industry, and the very different conditions which a synthetic product has now to face compared with those obtaining in quite recent years, can be seen at a glance from the following tables:—

Plantations.—Area under Rubber.

	Ceylon.	Malaya.
1901	... 2,500 acres	... nil.
1902	... 230,000 acres	... 621,621 acres.

Tons of Plantation Rubber Exported.

	Ceylon.	Malaya.
1904	... 35 tons	... nil.
1912	... 6,697 tons	... 18,956 tons.

World's Supply of Plantation Rubber.

1912	... ... 28,500 tons.
1915	... ... 98,000 tons.

The rapid strides which have been made in the cultivation of rubber will thus be evident, and as there is every prospect of the yields increasing for some time to come this is bound to react on the price, and it is generally assumed that unless a synthetic product can be put on the market at about 1*s.* 3*d.* per lb. there is little hope of the natural material being superseded.

As chemists, perhaps, it would be gratifying to know that another triumph had been won in the industrial field, but whatever the outcome may be, it is well to remember that the chief factor militating against success is the result of scientific energy expended in other directions, that is to say, in raising the product of the plantation to the highest pitch of perfection.—*The India-Rubber Journal.*

PLANTERS' LIBRARY.

The following list of Books and Publications is published in accordance with a resolution passed at the Annual Meeting of the U.P.A.S.I. 1916.

This list makes no pretence as being a complete one but contains a few books which have been published recently which it is thought will be of more special interest to South Indian planters. It will be added to from time to time.

General.

Note Book of Agricultural Facts and Figures, by R. C. Wood, Price Re. 1. Obtainable from Messrs. Higginbothams Ltd., and at all Railway Bookstalls.

Sub-Tropical Vegetable Gardening by P. H. Rolf, Price 6s. 6*d*. Publishers. MacMillan & Co., New York.

Hints for the Cultivation of Roses by H. J. Davies, Bulletin 36. Department of Land Records and Agriculture, United Provinces. Price As.1. Messrs. Higginbothams Ltd., Messrs. Thomson & Co., Madras.

Green Manuring in India, by A. C. Dobbs. Bull. 56 Agricultural Research Institute, Pusa. Price as. 6. Messrs. Higginbothams Ltd., Messrs. Thomson and Co., Madras.

Green Manures and Manuring in the Tropics by P. de Sornav. Price 16s. Publishers John Bale, Sons and Danielsson, 83-91. Great Tichfield Street, London W.

Some South Indian Insects by T. Bainbrigge Fletcher. Price Rs. 6. Messrs. Higginbothams Ltd., Messrs. Thomson and Co., Madras.

Soil Conditions and Plant Growth by E. J. Russell. Price Rs. 4-6. The City Book Co., 1, Thumbu Chetty Street, Madras.

Elementary Botany for India, A Manual of—by Rai Bahadur K. Rangachariar. Price Rs. 2. Messrs. Higginbothams, Ltd., Messrs. Thomson & Co., Madras.

Coffee.

Coffee, its Cultivation and Manuring in South India, by R. D. Anstead. Bulletin 6. Mysore Agricultural Department, Price annas 2. Office Director of Agriculture, Mysore Agricultural Department, Bangalore.

Tea.

Notes on the Spraying of Tea, by E. A. Andrewes and A. C. Tunstall Price Rs.2.

Some aspects of Modern Tea Pruning by G. D. Hope and P. H. Carpenter, Price Rs.2.

Report on Some Aspects of the Tea Industry of Java and Sumatra by G. D. Hope. Price Rs.2

The Quarterly Journal of the Scientific Department, Indian Tea Association.
Obtainable from the Secretary, Indian Tea Association, 20, Strand Road, Calcutta.

Rubber.

The Physiology and Diseases of Hevea Brasiliensis by T. Petch, Price Rs. 10.

Black Thread Disease of Hevea in Burmah (bark Rot) by J. F. Dastur, Bulletin 14, Department of Agriculture, Burmah.
Price as 2, Messrs. Higginbothams, Ltd., Messrs. Thomson & Co., Madras.

NODULES ON HEVEA.

A great deal has been written from time to time on the subject of Nodule or Burr formation on Hevea Rubber Trees. The latest publication to hand is *Bulletin No. 28 of the Department of Agriculture, Ceylon* from the pen of Mr. G. Bryce who has been making a special study of the subject. The author's summary of this Bulletin is as follows :—

"1. Nodules are produced in the cortex of *Hevea brasiliensis* as the result of an alteration in the latex vessel content.

"2. This alteration has not been connected with the attack of any parasitic organism, but appears rather to be due to physiological changes in the latex.

"3. The tendency to suffer alteration in the latex vessel content appears to be confined to certain individual trees which have a predisposition to develop this condition.

"4. Four types of nodule have been distinguished :—

(*a*) Nodules formed round altered latex vessels.

(*b*) Nodules formed round lesions in the cortex into which latex has oozed and coagulated. May occur in any *Hevea* tree.

(*c*) Nodules formed round areas into which latex has oozed and coagulated; the coagulated latex occupies the intercellular spaces without lesion of tissue. May occur in any *Hevea* tree.

(*d*) Nodules formed round under unknown conditions round areas of cortex from which latex may be entirely absent. Rare.

"5. Globular shoots formed by the subsequent growth of latent buds after these have lost their connection with the stem occur in both tapped and untapped trees. They are distinguished from nodules by the absence of a core, and they never form large masses of woody tissue as nodules do.

"6. Nodules of (a) type do not occur on untapped trees.

"7. Nodules occur on *Hevea* in its native habitat in Brazil; and in Tropical America and the Eastern Tropics where it has been grown in plantations.

"8. The percentage of trees which develop nodules is very small.

"9. Tapping appears to induce nodule formation in predisposed trees.

"10. This abnormal condition is apparently not infectious."

It will be seen from this that Mr. Bryce reaches the conclusion that the phenomena is not due to any specific disease but rather that certain trees have an hereditary predisposition to the alteration in the latex vessel content which induces the nodule proper. Hence as has been pointed out before by Petch and others great care should be taken to select seed for planting from trees free from nodules.

No seed selection took place in the early days of the rush to plant rubber; a seed was then a seed and a potential tree and no thought was given to its parentage. The evidence of Mr. Bryce's investigation goes to show that wounding, including the operation of tapping has some effect in including the alteration in the latex vessel content in trees which are predisposed to this condition.

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Contents.

The Deputy Director of Agriculture, Planting Districts, and the Secretary. U. P. A. S. I. have returned from Cochin.

We publish the proceedings of an Extraordinary General Meeting of the Nilgiri Planters' Association, at which the subject discussed was the Coffee Stealing Prevention Act 1878.

We publish a precis of the Committee Meeting of the South India Branch of the Rubber Growers' Association held at Cochin which was well attended. The two most important matters discussed were the use of Bordeaux Mixture for the cure of Pink Disease, and Abnormal Leaf Fall. Much interesting and valuable information was given by members present, and four members have given 100 acres each to the Scientific Department to continue experiments on both diseases.

We continue and conclude our extract on a Modified Method of Green Manuring taken from the Agricultural Research Institute, Pusa, Bulletin 63.

R. D. A. furnishes us with an article on Markets, Prices and Statistics.

Of value to planters will be found the article Unit Value of Fertilisers.

We continue the article on Coffee Planting for Profit from *Tropical Life.*

An interesting letter on a species of beetle is written by Mr. Poyser, whose letter and specimen were sent to Doctor Leslie Coleman whose letter of information on the subject we gladly publish.

SOUTH INDIA PLANTERS' WAR FUND.

	Rs.	A.	P.
Amount previously acknowledged	54,363	1	11
Messrs. Barber & Pascoe	75	0	0
"G. R."	25	0	0
The Hon. Mr. E. F. Barber	100	0	0
"Snookers," Cochin Club	10	0	0
Total...	54,573	1	11

DISTRICT PLANTERS' ASSOCIATIONS

Nilgiri Planters' Association.

Proceedings of an Extraodinary General Meeting of this Association held on 14th November at the Sub-Collector's Office, Coonoor.

PRESENT:—Messrs. P. L. D. Beaver, R. N. C. Grove, A. S. Dandison, C. W. Deane, J. H. Pascoe, A. G. Nicholson, A. K. W. Downing, J. B. Vernede, J. E. Bisset, J. Stanes, L. A. Gerrard Rogers, (Honorary Secretary), W. A. Cherry, and D. J. D. Cockburn, Proxies:—Bayly and Brock Ltd., by their proxy Mr. R. N. C. Grove, Hony: Member:—Mr. E. H. Jones, D. S. P., Visitors:—Messrs D. H. McLeod and C. B. Vernede.

Read Telegram from Mr. J. S. Nicolls expressing regret at his inability to attend the Meeting as he was awaiting news of Mrs. Nicolls. The Meeting expressed its satisfaction at the escape of Mrs. Nicolls who was on the "Arabia."

Mr. Pascoe was elected to the Chair.

COFFEE STEALING PREVENTION ACT, 1878.—Read Collector's letter asking for the opinion of the Association on the proposals made by the Shevaroy Planters' Association.

A circular containing full particulars of these proposals had previously been sent to all Members by the Honorary Secretary. After a discussion on the Draft Rules the following resolutions were carried unanimously that this Association is in favour of Section 5 (1) *viz.*, "That every person receiving a consignment of coffee under permit issued under Section 10 of the Act shall retain for one year the duplicate copy of the permit under which it reaches him in support of the entry made in the accounts he is compelled to keep under Section 5 and shall produce the permit when called on." Section 5 (2) The Account books kept under Sections 5 and 5-A shall be separately maintained from any other accounts kept by the individual concerned and shall show the balance on hand on any given date. With regard to Section 10 the following Resolution was passed:—Proposed by Mr. Gerrard Rogers and seconded by Mr. A. S. Dandison "that the word 'Triplicate' be substituted for 'Duplicate,' the original be retained by the Superintendent, Agent, or Proprietor of the estate, the Duplicate be retained by the receiver and the Triplicate be sent to the District Superintendent of Police." Carried unanimously. It was decided that this Association are in favour of the clause in Draft Rule (2) dealing with the Imperial Bushel. In connection with the pass books the following Resolution was carried unanimously:—Proposed by Mr. A. S. Dandison, seconded by Mr. C. W. Deane, "that when Pass books are applied for, that the acreage and season estimate be given. The reason for this being that abnormal yields from small holdings could be investigated. Any unused Passes to be returned and re-issued each season."

A further resolution on the subject of passes was proposed by Mr. Gerrard Rogers, seconded by Mr. P. L. D. Beaver and carried unanimously:—"That the District Superintendent of Police be asked to request the Railway Company to file all coffee passes received with consignments of coffee sent to the Railway Stations for forwarding by rail and that they be checked by the Police periodically."

As the subject was considered of great importance the following Resolution proposed by Mr. C. W. Deane and seconded by Mr. R. N. C. Grove was put to the Meeting and carried unanimously:—"That the views expressed at this Meeting be represented to Government as a matter of urgency and that the Planting Member be asked to press the matter so as to meet the wants of the current coffee season."

A vote of thanks to the Sub-Collector for kindly allowing the use of the room was passed. With a vote of thanks to the Chair, and to the D. S. P. for attending, the Meeting closed.

(Signed) J. HARDING PASCOE,
Chairman.

(„) L. A. GERRARD ROGERS,
Honorary Secretary.

The best-known instances of luminosity in insects are to be found among the beetles; the various species of glow-worm and firefly belong to this order. But the same, or an analogous, phenomenon is occasionally observable in other insect groups, as, for example, in the "fungus gnats" and crickets. There are at least two well-authenticated records of luminosity in the larvæ of moths, and quite recently the Rev. J. Holroyde, Vicar of Patcham, has reported to us an observation of luminous larvæ near Brighton. The species of these larvæ was not determined, but they appear to have been the caterpillars of a moth, probably a Noctuid. Boisduval, whose record is one of those above alluded to, believed that the luminescence in his larvæ was due to disease, and it has been suggested that decomposition due to bacterial infection is the cause of a similar appearance that has been described in other insects not usually luminous, as Chironomus (a kind of gnat) and the so-called "lantern flies" of South America. It is evident that the exceptional production of light in the cases just mentioned is very different in nature from the entirely normal illumination of the glow-worms and fireflies, though it may equally be due to the oxidation of some organic material.—*Nature.*

The deficiencies of modern India in the matters of house building and sanitation are a cause almost of despair to the authorities. No problem is so difficult as that of sanitation, because the official runs the constant risk of offending some religious or social prejudice. But it is not because their own writers have neglected the subject that the present condition of things has arisen. In the June issue of the Journal of the Bihar and Orissa Research Society Dr. Mahamahopadhyaya Ganga Nath Jha has collected the ancient Sanskrit laws on the subject. They deal with the sanitation of houses, and provide minute directions on the right uses of food and drink. Much of this is, no doubt, academic, and the rules on these subjects are the speculations of philosophers which in many cases could not have been brought into actual practice. But many of them are judicious, and may help the officer of health in preaching the value of sanitation. The Pandit ends by saying:—"From the above it will be seen that the old people of this country knew and practised many laws of health and sanitation which have been forgotten, with results that all deplore."—*Nature.*

RUBBER GROWERS' ASSOCIATION.

Minutes of Committee Meeting of the South India Branch of the Rubber Growers' Association held at the Cochin Club on the 25th November, 1916.

PRESENT:—Messrs. J. S. Nicolls (Chairman), R. D. Anstead (Deputy Director of Agriculture, Planting Districts), J. Dell, H. H. Jones, B. M. Behr, E. H. Halliley, J.F. Fraser, S.P. Eaton, J. Stewart, J. Mackie, J.R. Vincent, C. Barton-Wright and F. Norton (Secretary). *Visitors*:—Messrs. W. McRae (Madras Government Mycologist) and L. M. Guyver.

Notice calling the Meeting was read.

Before commencing the Agenda the Chairman rose and proposed the following resolution which was carried unanimously, all standing:—

"Gentlemen,—In the death of Mr. Lampard we have lost that which our Industry can ill spare. A great mind, working not only in his own interest and that of his employers, but in that of all of you here to-day. What the Rubber industry would have been without Mr. Lampard it is hard to imagine, but I feel certain you will all agree with me when I say to him is due your deepest gratitude for having put before you those statistical problems that must have cleared away any doubts you may have had in your minds as to the soundness and permanency of your rubber investment. I ask you to authorise your Secretary to tender to his bereaved family your sincerest sympathy in their sad loss."

The Minutes of the last meeting were then read and confirmed. Correspondence was read.

The list of estates was placed on the table showing a total of 53,295 acres to which may be added about 6,000 in native hands making a total of 59,295 acres.

Mr. Vincent on behalf of the Mundakayam Valley Rubber Company proposed the following Resolution which was seconded by Mr. S. P. Eaton and carried:

"That the Local Branch of the R. G. A. be asked if their Parent Association is taking any action with regard to the causes which are keeping down the prices of Plantation Rubber."

Mr. S. P. Eaton, seconded by Mr. E. H. Halliley, proposed the following resolution: "That in the opinion of the Pullangode Estate Bordeaux Mixture has not proved a satisfactory preventative of Pink Disease and would invite the opinions of other Districts on the subject in order that this might tend to further investigation and suggestions by the R. G. A."

As an amendment to the above Mr. Anstead proposed and Mr. Vincent seconded the following:—

"That in the opinion of the Local Branch of the South India Rubber Growers' Association more investigation is required as to the efficacy of Bodeaux Mixture for preventing Pink Disease, and invite the co-operation of all Rubber growing Districts in the matter."

On being put to the vote the amendment was carried.

Abnormal Leaf Fall was discussed at some length and much interesting details were given. At the request of the Chairman Mr. McRae addressed the meeting and was cordially thanked.

The following four gentlemen placed at the disposal of Mr. Anstead and Mr. McRae a hundred acres each for continued experiment as regards abnormal leaf fall and pink disease, namely, Messrs. Vincent, Eaton, Stuart and Barton-Wright.

It was decided to hold the next meeting of the Local Branch at Calicut in March next on a date to be fixed hereafter.

A vote of thanks to the Committee of the Cochin Club for kindly placing a room at the disposal of the Local Committee R.G.A., was unanimously passed.

With a vote of thanks to the Chairman the meeting closed.

SOIL.

A Modified Method of Green Manuring.

(Continued.)

The results are given in the following table:—

Tobacco manuring with fermented sann hemp.

No. of plots.	Treatment.	Green Leaf. Pounds per acre. Furrow (*b*).	Increase	Ridge (*a*).	Increase
		lb.	lb.	lb.	lb.
1	No manure	...11,252	...	9,609	...
	Fermented *Sann* anaerobic 3:1	...12,022	770	11,500	1,891
	Fermented *Sann* aerobic 3:1	...14,550	3,298	13,548	3,939
	Fermented *Sann* anaerobic 6:1	...14,898	3,646	16,118	6,509

In these plots the superiority of the aerobically fermented manure over that prepared anaerobically is obvious; there is reason to believe, however, from other observations, that this would not invariably be the case, especially in view of the fact that the manure was not allowed any opportunity of aeration after fermentation and before burying in the soil. The plants in the ridges gained an advantage in this respect from the fact that their feeding roots did not reach the manure so early as did those of the furrow planted seedlings, as well as from the better aerated soil in the ridges in which they made their early growth, before drying out of the soil had taken place to any extent. When this began to occur the roots had reached the buried manure and were not only benefiting by the nitrogen supply derived therefrom but from the moisture-holding power of the well rotted vegetable matter, to which reference has already been made.

With regard to the difference in character of the anærobic and ærobic preparations, it was found that when first taken from the heap the former contained no nitrate but a considerable amount of ammonia (recoverable by distillation with magnesia although not free). A water extract of the material was toxic to seedlings, but this condition was changed and nitrate formation took place after ærobic conditions were introduced, more complete nitrification of the organic nitrogen present being eventually obtained than was the case with the ærobically prepared material. This was in accordance with the laboratory observations of the previous year, and confirms the conclusion as to the possibility of preparing a more rapid acting manure by this method, keeping in view, however, the necessity for interposing an ærobic stage between the anærobic preliminary one and the final application to the soil, not only to promote nitrification, but to ensure the oxidation and destruction of the toxins produced.

In some cases, for example where irrigation is practised, it might be more convenient to make use of a different application of the method. When the fermenting material is allowed to remain in the soaking pit, instead of being removed from the water after 24 hours' immersion,

decomposition proceeds with liberation of ammonia which goes into solution in the water. This ammoniacal water is known in Bihar as *seet water* and was formerly allowed to run to waste, but is now conveyed by drainage channels on to arable land as a fertiliser. It was found on experimental oat plots that such *seet water* prepared from sann hemp was of great fertilising value, the ammoniacal and other nitrogen contained in it becoming rapidly available as plant food; the residual effect, however, as was expected, was practically nil. It was further found that decomposition of the green material whether sann hemp, cut grass, mustard or maize stalks, proceeded for several weeks under water, the latter being drawn off periodically (at weekly intervals) and used to fertilise soil, the same amount of fresh water being added to the pit. After some four to six weeks, depending upon the temperature, the remaining water was drawn off and the residual material was then found to be completely broken down into a fine material closely resembling well rotted farmyard manure, greatly reduced in bulk but containing a fair percentage of nitrogen which readily nitrified in soil.

The *seet water* prepared in this manner was also used here for fertilising turf and produced very similar results to those obtained with sulphate of ammonia, possessing one notable advantage over the latter, however, in not requiring the presence of considerable quantities of lime in the soil. It has been found at Pusa that the cut grass from the golf course can be used to fertilise the putting greens by preparing *seet water* in this way, and the method is recommended as the most economical and efficient one known to the writer. The drawback to its use in proximity to dwelling houses is the unfortunate odour; this can be overcome by careful additions of copper sulphate (0·025 per cent.) and potassium cyanide (sufficient to prevent precipitation of the copper as sulphide) to the water in the pit; this addition in these proportions prevents the formation of bad smelling compounds such as indol and skatol, but does not inhibit ammonification.*

*(Since writing the above it has been found that Arhar, (*Cajanus indicus*) refuse, after threshing, yields on fermentation a completely odourless manure. This is apparently due to the presence in the tissues of this plant of certain compounds which control the character of the bacterial fermentation.)

It is suggested therefore that in irrigation areas distribution of the nitrogenous content of the green manure made available by fermentation might be carried out more easily and economically so far as labour is concerned, by allowing fermentation to proceed in water in the above described manner and conveying the ammoniacal water thus produced to the land by means of the irrigation channels.

The residual solid material, by reason of its loss of weight and complete disintegration, will be found easy to handle as compared with the incompletely fermented manure.

The principle underlying the use of this method, *i.e.*, the more complete decomposition of organic manures by the provision of anaerobic or semi-anaerobic conditions during the early stages of this process, may be made use of in the treatment of soil to which such organic manures have already been added; thus in a field experiment in which the toxic effect of water-logging a soil containing added organic matter (in this case mustard cake) was tested, it was found that by regulating the water supply it was

possible to produce complete decomposition of the added cake and yet to avoid the toxic condition by providing proper drainage. The very greatly increased growth on this watered and drained plot as compared either with one receiving less water or one receiving more, was not due merely to the use of the optimum amount of water required to produce the best physical condition of the soil nor for supplying the plants, as the former was allowed to dry out and was thoroughly cultivated before sowing in all three plots; moreover the differences in growth which eventually occurred did not become apparent for some weeks after germination, when the roots of plants had got down into a layer which in the undrained plot contained toxins, and in the drained one, available plant food. Similar variations in the water supply produced no such results when nitrogen was applied in the form of ammonium sulphate, confirming the conclusions above mentioned.

A further advantage of the method lies in the possibility of applying the fermented manure at the rate per acre at which experience has shown it will do the most good to the particular soil or crop which it is intended to benefit. This is an aspect of the case which the writer feels some diffidence in enlarging upon, but it appears that there must be an optimum rate per acre for application of any manure to any one soil for the benefit of any particular crop, and judging by experience with green manures in tea soils and with indigo *seet* as a manure for tobacco, oats, and maize, the rate per acre most likely to produce not only immediate returns in crop increase, but permanent improvement in soil conditions, is far removed from that secured by merely turning in a green crop on the area upon which it has been raised. Indigo *seet* is very generally applied at a concentration rate of about ten to one, *i. e.*, the crop from ten acres of indigo land is made into *seet* and returned on to one acre of tobacco or other land. This appears an unnecessarily high ratio, the increases in the tobacco experiment above described having been above the normal return from *seet* with a three to one ratio and still larger with a six to one. Experience is required not only to determine the profitable rate per acre for various crops, but the best fermentation periods and more especially the best times of application. There can be little doubt, however, that in a large number of cases the mere concentration of the green manure up to an effective rate per acre for nitrogen as a crop stimulant gives the cultivator a degree of control in this direction which the burying of a green crop in the ordinary way could not secure, whilst the no less important amelioration in the condition of the soil due to the addition of considerable quantities of well-rotted organic matter will play an important part in its permanent improvement and general fertility. It may further be pointed out that in some cases it may be found advantageous to grow the green crop on one area and apply it to another, thus poor waste, or jungle lands might be made to contribute to the fertility of better soils under arable cultivation. This point, however, is one which can be dealt with more effectively by agricultural experts, whose advice on the subject will be welcomed by the writer.

It is suggested, then, that the use of the above described method, modified to suit local conditions, will be found to remove the practice of green-manuring from the fortuitous region of dependence upon rainfall to one in which its proper use will place it on a level with such comparatively expensive fertilisers as oilcake and cattle manure. Pusa, April 1916.—*Agricultural Research Institute, Pusa, Bulletin No. 63.*

MARKETS, PRICES, AND STATISTICS.

Coffee.

Brazil receipts to 20th October.

1916.	1915.	1914.	1913.
5,839,000	6,685,000	3,588,000	6,726,000

Offerings at auction have been :—

——	10th—20th Oct.	Since 1st Jan.	Last year.
East India	315	27,102	41,041
Costa Rica	1,100	95,082	104,588
Other Milds	3,170	71,647	152,864
Brazil	7,775	96,027	110,612
Robusta	Nil.	1,453	13,558
B. E. A. & Uganda	2,366	15,406	10,484

Messrs. T. H. Allan & Co's. Report dated 24th October states that the Coffee market has been very quiet, and that prices in auction have occasionally shown a little easiness. The French market has been easier. Futures, however, are a little firmer, and if this continues France may improve again and make a c. i. f. business possible if freight can be obtained.

The Mysore Chamber of Commerce Weekly Report dated 20th November states that there is no demand locally and quotations are more or less nominal. Price per maund of $26\frac{1}{2}$ lbs ; Peaberry ranges from Rs.14 to Rs.16 ; Parchment, Rs.11/4 ; Native Rs.10/8, Chickmaglur quotes Peaberry, Rs.14 to Rs.14/8 ; Native No. 1, Rs.11 to Rs.11/8 ; Native No. 2, Rs.10/8 to Rs.10/12, per maund of 28 lbs.

Tea.

Messrs. T. H. Allan and Co., report that the market is strong all round. Prices up to about 11*d.* show an advance of $\frac{1}{4}d.$—$\frac{1}{2}d.$ over that level, They are irregular but dearer.

The following prices were obtained for South Indian Teas at the London sales of 23rd and 25th October :—

—	B.O.P.	O. P.	B. P.	Pek.	P. S.	Fgs.	Dust.
TRAVANCORE.							
Lockhart ...	11¾	10¼	11½	10¼	9½*	...	...
Venture ...	10½	...	...	9½*	9	...	...
Periavurrai ...	...	...	11¼	...	...	11½	...
Letchmi ...	11¼	11	11¼	...	9¾	11	...
Stagbrook ...	10¾	...	10½	9¾	...	...	...
Sirikundra ...	9¾	...	...	...	8¾	...	...
Gundamullay ...	11½	...	11¼	...	10¼	11¾	...
Chokanada ...	1/-	...	11	...	9¾	11¼	...
Surianalle ...	1/-¼	10¾	11	10½	...	...	...
Yellapatty ...	1/-	...	11¾	...	...	1/-	...
Bonaccord ...	9¾	...	9½	9	...	...	...
NILGIRIS.							
Barwood ...	10¼	...	...	9¾	...	...	...
Prospect ...	11½	11¼	11	11¼	...	...	...
WYNAAD.							
Askena ...	10½	...	10¼	9¾	...	10¼	...
Ermaculla ...	10½	...	10¼	9¾	...	9¾	...
ANAMALLAIS.							
Parallai ...	10½	11	...	10¼	...	9¾	9¼
Stanmore ...	9¾	...	...	9½	9¼	10	...

* Withdrawn from sale.

Rubber.

Messrs. T. H. Allan and Co., report that the rubber market has become dull and prices went back 1½*d*. During the week ending 24th October, however, although business has been quiet prices have been steadier. Crepe 2/4¾. Smoked sheet, 2/4½.

Spices.

Pepper.—Home market very quiet. Local prices range from Rs. 13 to Rs. 14 per 25 lbs.

Cardamoms.—In the home markets a little business has been done in the cheapest kinds, but the market generally speaking remains lifeless. Local prices are Rs. 24 to Rs. 30 per 25 lbs.

R. D. A.

UNIT VALUES OF FERTILISERS.

The Unit Value of a Fertiliser is the cost of one per cent. of plant food per ton. It is got by dividing the cost of the fertiliser by the percentage of Nitrogen, Phosphoric acid, or Potash it contains. Another Unit Value sometimes used is the cost per pound of each of the plant food ingredients in the fertiliser. The following table shows the approximate unit values of fertilisers in South India ruling at the beginning of November, f. o. r. Calicut. Prices, fluctuate somewhat rapidly owing to war conditions so that these units are only temporary, but they can be easily recalculated if the price per ton and the composition of the fertiliser is known.

NITROGEN.	Cost per ton.	% age.	Nitrogen.					
			Value of 1% per ton.			Value of 1 lb.		
	Rs.	*N.*	*Rs.*	*a.*	*p.*	*Rs.*	*a.*	*p.*
Nitrogen in a soluble and highly concentrated form—								
Sulphate of Ammonia ...	350	20	17	8	0	...	12	6
Nitrate of Soda ...	330	15	22	0	0	...	15	8
Nitrate of Lime ...	335	13	25	12	4	1	2	5
Nitrolim ...	350	18	19	7	1	...	13	11
Nitrogen in an insoluble form but easily decomposed—								
Blood Meal ...	190	11	17	4	5	...	12	4
Ground nut Poonac ...	85	7	12	2	3	...	8	8
White Castor Poonac ...	75	5	15	0	0	...	10	8
Neem Poonac ...	65	4	16	4	0	...	11	7
Hongay Poonac ...	55	3	18	5	4	...	13	1
PHOSPHORIC ACID.								
Superphosphate ...	90	15	6	10	8	...	4	3
Concentrated Superphosphate ..	230	42	5	7	7	...	3	11
Basic Superphosphate ...	79	12	6	9	4	...	4	8
Basic Slag ...	120	17	7	0	11	...	5	0
POTASH.								
Sulphate of Potash ...	400	48	8	5	4	...	6	5
	240	25	9	9	7	...	6	10

In the case of fertilisers which contain two plant foods, such for example as Saltpetre, the Nitrogen is allowed for at the unit value in the table above and the value of the Potash then calculated. In the case of Phosphatic fertilisers the value of the Phosphoric acid which is insoluble is usually taken as half that of the phosphoric acid which is water or citrate soluble.

—	Cost per ton.	Guarantee.			Unit Values.								
		N.	P.	K.	Nitrogen.			Phos. acid.			Potash.		
	Rs.	—	—	—	*Rs.*	*a.*	*p.*	*Rs*	*a.*	*p.*	*Rs.*	*a.*	*p.*
Saltpetre ...	320	9	...	30	17	8	0	...	...	...	5	6	8
Bone Meal ...	65	4	22	...	12	2	3	...	11	11	...	...	...
Bone Guano ...	100	7	12	...	12	2	3	1	4	0	...	...	...
Milled Fish ...	70	5	5	...	8	8	5	5	7	7	...	...	...
Fish Guano ...	130	7	6	...	13	14	1	5	7	7	...	...	...

In the case of fertilisers containing three plant foods, complete manures, the value can be calculated from the above tables. For example suppose that a fertiliser guaranteed to contain 4% of Nitrogen, 7% of Phosphoric acid, and 5% of Potash is to be dealt with. We have:—

			Rs.	A.	P.
4 units of Nitrogen	@ Rs. 12-2-3	...	48	9	0
7 units of Phosphoric acid	@ Rs. 5-7-7	...	38	3	1
5 units of Potash	@ Rs. 8-5-4	...	41	10	8
		Total...	128	6	9

Anything charged over this is for mixing, bagging, etc., and this should not amount to more than 5%.

These figures represent top grade materials, Nitrogen as Groundnut Poonac, Phosphoric acid as Superphosphate, and Potash as Sulphate. There is nothing however to show that the dealer has used such materials, and for this reason planters are advised to either make their own mixtures or have them made up to a formula of their own.

For example suppose the following Tea Manure often used is considered, a mixture of 200 Groundnut poonac, 150 Fish, 50 Blood, 50 Steamed Bone, and 50 Sulphate of Potash. The same proportions of Nitrogen, Phosphoric acid, and Potash are supplied pretty nearly by a mixture of 100 Groundnut poonac, 200 White Castor poonac, 150 Bone Guano, and 50 Sulphate Potash, but at present prices while the former costs Rs. 121 per ton the latter costs only Rs. 117 per ton for ingredients and moreover it is not so valuable a mixture nor so quickly available. Calculated on unit values alone there is nothing to show this or the loss of Rs. 4 per ton. Such a mixture should be ordered therefore by naming the ingredients of which it is to be composed and not on its percentages of plant food only.

COFFEE.

Coffee-Planting for Profit No. III.

A few General Notes.

Probably one of the immediate effects of the European War, wrote Rudolph Anstead, in the *Planters' Chronicle*, of Bangalore, may be to force planters to economize on their estimated estate expenditure. In view of this, he adds, "I would call attention to the great value of green manuring, which, being slower in its effects, is of lasting value to the crop, as well as being cheaper to carry out than the usual systems of manuring." "The coffee tree," wrote the *Tea and Coffee Trade Journal*, when discussing its cultivation in Arabia, Abyssinia, &c., last February, "first flowers, as a rule, when three years old, but the crop is then small. In Brazil the crop produced in the fourth year is about sufficient to cover the cost of collection; it increases in the fifth year, and a full crop is produced in the sixth one. The yield then increases annually, reaching its maximum between the fourteenth and the eighteenth years, after which it gradually diminishes until the end of its life, which, on the average, extends to forty years. The fruit takes about seven months to come to maturity; but since the flowers open at different times, the fruit are not all ready to pick at any one period. The amount of coffee produced by a tree (still quoting *the Tea and Coffee Trade Journal*) depends on its age, on the kind of coffee, or climatic conditions, on the fertility of the soil, and on other factors, so that the yield not only varies in different countries, but from year to year the output is different on the same estate. In Ceylon a yield of 1 lb. of cleaned, saleable coffee per tree was regarded as a high average. On the other hand, an average of 5 lb. of marketable coffee per tree was obtained during a period of eleven years on an estate in Sao Paulo, the maximum during this period being 8½ lbs. and the minimum a little over 2 lbs. Messrs. Brown and Hunter, in their book on "Planting in Uganda" (*Tropical Life* Publishing Department, price 10*s*. 6*d*. net), give the average yield of marketable coffee in Uganda as being 2 lb. a tree.

The *Planters' Chronicle* published the following particulars from a North Mysore planter, showing the average weight per bushel of his coffee and the number of bushels that went to make up a ton. The figures quoted are for one estate and for one year only, during which the yield worked out at just over 5 cwt. per acre; but it is only fair to point out that the trees of Coorg coffee in the adjoining field gave better results. There were two varieties mentioned in the particulars given, *viz*., ordinary *Arabica* coffee and Golden Drop coffee. Of these the Arabica gave 441 bushels (average weight on arrival at the curing works 30·17 lbs. per bushel, or after drying 28·6 lb.), and the Golden Drop 39 bushels (average weight per bushel on arrival at curing works 30·8 lbs., or after drying 28·6 lb.) The out-turns were very poor in Mysore during that year on account of the bad season (1915). During the previous crop the out-turn averaged 86 bushels to the ton, the highest being 88, and the lowest 85. During the crop under review the highest out-turn on the same estate was 101, and the lowest 92 bushels. According to Mr. Anstead, speaking at a conference of coffee planters held on June 5th, Southern India has 194,725

acres under coffee, as compared with 64,000 acres under tea, and 50,000 under rubber. The area under coffee was made up as follows:—

	Acres.
Mysore State	104,652
Madras Presidency	44,085
Coorg	42,495
Cochin State	2,507
Travancore State	986
Making	194,725

Later on, of course, we shall fully discuss the nature of the soil and conditions in the Blue Mountains of Jamaica that enable that centre to produce coffee with such a wonderfully fine aroma and flavour; but in order to show that there is still room for Southern India and elsewhere to put forth larger supplies of its best qualities, we would add that according to a correspondent in the *Agricultural News*, of Barbados, only a small proportion of the famous hill area is under coffee, so much so that our West Indian contemporary considers it to be a matter of regret that the cultivation of coffee in this district has not received, and is not receiving greater attention, especially as the area available tends to become less and less through erosion and loss of the valuable soil from the sides of the hills. It appears that the land on which the plants grow is generally on very steep hillsides, and in many places the soil is now insufficient owing to erosion, and too poor to produce profitable coffee bushes, except in the little valleys and pockets where there is still a depth of suitable soil. On this account an estate having perhaps a thousand acres at one time or another, suitable for coffee, might to-day find it difficult to maintain 100 to 150 acres under the crop. The yield also seems small running, according to the correspondent (Mr. St. George Spooner, of Jamaica) of the *Agricultural News*, from 100 lbs. to 266 lbs. only per acre per annum, the larger amount being considered very good. "Since," adds Mr. Spooner, "there are 1,815 trees to the acre, planted 6 x 6 ft., the yield per tree for a good crop works out at about only $1\frac{3}{4}$ oz. per tree per annum," against, we must remind our readers, the reported minimum of 2 lb. per tree at Sao Paulo, as stated at the beginning of these notes.

Useful anywhere, a river is an asset of great value on a coffee estate, very truly points out *Simmons' Spice Mill*, when discussing coffee planting in Guatemala. From it can be taken the water supply for the dwelling houses and stabling, horse paddocks, &c., and also to develop power for driving machinery and for irrigation purposes.

Owing to the value of bees in bringing about the pollination of coffee, Mr. Bainbrigge Fletcher, the Imperial Entomologist to the Government of India, who, before that, was Government Entomologist, Madras, recommended that in districts in India in which the destruction of bees (*Apis dorsata*) occurs on any considerable scale, it were well that the Forestry Department be requested to refuse the issue of rights to the jungle tribes to collect honey and wax in forest areas except under special restrictions. These restrictions, it appears, are necessary because it is not practicable to take the honey without destroying the bees unless the bees have deserted their combs, which they do at regular times of the year, and the collectors do not always wait for these periods.—*Tropical Life.*

(To be continued.)

CORRESPONDENCE.

Bonaventure Estate,
Nagalur P. O.,
Shevaroy Hills, Salem District,
8th November, 1916.

THE EDITOR,

Planters' Chronicle.

Dear Sir,—In Mr. Bainbrigge Fletcher's book "Some South Indian Insects," we find the white borer and red borer among the insects which attack coffee. I have found both of these on my estate. I have also found another borer about which I shall be obliged if you or your readers can give me any information as to what sort of insect the boring grub turns into and about what time of year it may be expected to do so.

This borer is of a creamish yellow colour with a brown face, rather wrinkled. It is a grub not a caterpillar as it has the six legs but has no suckers as caterpillars have. I have found it most abundant in a five year old clearing at an elevation of about 4,200 feet. It seems to prefer young trees to old ones but I have not found it in young green suckers or plants. It enters the tree about 9 inches from the top of the stem and bores about two inches or so straight upwards. If the tree in which one of these grubs is living is gently tapped the grub comes down to the hole and just fills it with his ugly wrinkled face which looks much like the bark of the tree. When doing this he can be easily caught by putting a pin through the back of his neck and pulling him out, or a piece of wire may be inserted up his burrow thereby killing him. I have caught grubs of various sizes up to three quarters of an inch long.

I have some of these grubs under observation at present but shall be glad if any one can tell me anything of the habits or looks of the mature insects and its name.

Yours faithfully,
E. L. POYSER.

D. O. No. 193.

Office of the Director of Agriculture,
in Mysore,
Bangalore, dated 23rd November, 1916.

THE EDITOR,

Planters' Chronicle.

Dear Sir,—The "borer" specimens collected by Mr. Poyser and forwarded by you with your letter of the 20th instant turn out to be most interesting. They are the larvæ of a tiger beetle and the holes made in the coffee stems are formed not primarily, at least, with the object of obtaining food but as burrows in which the larvæ can hide and from there catch and feed upon insects which may pass by. It is thus not a true borer. That is the reason the larvæ comes to the opening of the burrow when the tree is tapped as has been so graphically described by Mr. Poyser in his letter.

A tiger beetle larvæ (that of Collyris emarginatus) with a similar habit has been found on coffee trees in Java and quite probably this is the same species. Tiger beetles as a family are predaceous both in the larval and adult stages. In most cases, however, the larvæ make their burrows in the ground. The damage done to coffee by this "borer" is likely to be very slight and in fact will probably be more than counterbalanced by the good done in the destruction of other insects.

Yours faithfully,
LESLIE C. COLEMAN.

The Planters' Chronicle.

RECOGNISED AS THE OFFICIAL ORGAN OF THE U. P. A. S. I., INCORPORATED.

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THE U. P. A. S. I.

(INCORPORATED.)

Contents.

Planters in particular and agri-horticulturists generally will be gratified to learn that the first step towards a Pest Act for Mysore has been taken in the Legislative Council of the State. A report of the motion for leave to introduce a Bill will be found in this issue.

We publish the proceedings of the Wynaad Planters' Association held on November 1st and November 22nd.

We give a further account of the Committee Meeting of the Local Branch of the Rubber Growers' Association held at Cochin on the 25th November, which will be read with much interest by all Rubber planters. Both Mr. Anstead and Mr. McRae spoke on the two most important subjects, and were listened to with attentive interest.

We publish our weekly article on Markets Prices and Statistics.

Just as we are going to press we have received too late for insertion in this week's issue a letter from the Honorary Secretary, Mundakayam Amateur Dramatic Society, enclosing a cheque for Rs. 834-6-3, the proceeds of an entertainment given at the Peruvanthanam Bungalow, as a contribution to the South India Planters' War Fund, which generous subscription we have great pleasure in acknowledging. In our next issue we shall publish both the letter and the balance sheet. We regret we cannot reproduce the artistic cover design of the programme, which merits something more than passing praise. We wish we could enrich the archives of the Chronicle for the pleasure of all our readers.

SOUTH INDIA PLANTERS' WAR FUND.

	Rs.	A.	P.
Amount previously acknowledged	54,573	1	11
Mr. A. S. Dandison	100	0	0
„ R. Lescher	30	0	0
„ Guy Turner	20	0	0
„ Stephen Bayly	10	0	0
„ J. J. Murphy	100	0	0
„ G. R. Pearse	20	0	0
Mundakayam Amateur Dramatic Society ...	834	6	3
Total...	55,687	8	2

DISTRICT PLANTERS' ASSOCIATIONS

Wynaad Planters' Association.

Proceedings of a Special General Meeting, held at the Meppadi Club, on November 1st, 1916.

PRESENT.—Messrs. Bisset, Blackham, Cheeseman, Gauld, Gillatt, Lobban, MacBain, Malcolm, Powell, Vernede, Whitton and C. E. Abbott, (Honorary Secretary). *Visitor*:—Mr. Craig.

Mr. Malcolm in the chair.

2280. ADMINISTRATION OF THE MADRAS PLANTERS' LABOUR LAW IN WYNAAD.—After full discussion it was resolved that figures be collected showing the number of coolies advanced for in 1916-17 on as many estates as possible, the amount of money advanced and the number of coolies actually on the estates.

Cases to be stated in which the Magistrate has refused to convict more than twice.

The following members were elected as a deputation to interview the Collector and to draw up a statement for his consideration. Messrs. Abbott, Bisset, Gauld, Malcolm, Powell and Whitton.

A vote of thanks to the chair.

(Signed) B. MALCOLM,
Chairman.
(,,) C. E. ABBOTT,
Honorary Secretary.

The members of the Deputation met the same day, with Mr. Malcolm in the chair.

Read letter from Mr. Evans, I. C. S., Collector of Malabar, to the Honorary Secretary.

It was decided to telegraph to Mr. Evans to ask if he could receive the deputation on Monday or Tuesday next (6th or 7th November.) The following *memorandum* was drawn up to be sent to Mr. Evans. The Vayitri Magistrate is at present administering Section 35 of the Madras Planters' Labour Law in the following manner:

He imprisons in the first instance, inflicts a fine without any alternative sentence of imprisonment on the second complaint and refuses to take any further action on the ground that "as no imprisonment was awarded no further direction can be issued."

This has occurred in the following cases that the deputation has before it. C. C. 711 of 1916 (Vayitri Magistrate's proceedings Oct. 13th 1916) C. C. 913/16, 1202/15 (Vayitri Magistrate's proceedings Sept. 14th 1916). Other cases have occurred.

We submit that these proceedings are in direct opposition to the High Court Ruling Cr. Revision case No. 367 of 1915 (Oct. 26th 1915).

Section 35 of the Act says "no *conviction* under the Act or imprisonment under such conviction shall have the effect of releasing the Maistry or Labourer from the terms of his contract or Labour contract as the case may be."

This action of the Magistrate is quite recent and contrary to his previous procedure.

If this interpretation of clause 35 is upheld by higher authority we shall be placed in a disastrous predicament. Our position and the position of our Maistries is that very large sums have been advanced on the security of clause 35. What is happening is that in such cases the balance of advances due by the Maistries to us and by their coolies to the Maistries is utterly lost. How serious this is will appear from the following advances given out on 8 estates belonging to 3 different companies and private owners,

	Amount advanced. season 1916.	No. coolies contracted for.	No. coolies on Estate Oct. 31st 1916.
	Rs.		
a.	21.315	1,559	1,099
b.	13,965	1.261	777
c.	27,345	2,601	1,421
d.	5,814	540	411
e.	7,639	534	391
f.	11,923	1,023	762
g.	11.225	1,085	834
h.	6,000	270	300

These are representative of a very large number of estates.

For deputation,

C. E. ABBOTT,
Honorary Secretary.

Wynaad Planters' Association.

Proceedings of a Meeting held on November 22nd 1916, at the Meppadi Club.

PRESENT.—Messrs. Blackham, Cheeseman, Gauld, Gillatt, Lobban, MacBain, Mackay, MacLeod, Malcolm, Morres, Nicolls, Powell, Vernede, Whitton and C. E. Abbott, Honorary Secretary. *Visitors* :—Mr. Anstead, Deputy Director of Agriculture. Mr. McRae, Government Mycologist, Mr. Craig, Mr. Flyter, Mr. F. Winterbotham.

MR. NICOLLS IN THE CHAIR.

2281. The Proceedings of the Meeting of October 25th were confirmed.

2282. TELEGRAPHIC COMMUNICATION.—Read letter from Postmaster General informing Association that the telegraphic connection between Meppadi and Cherambadi had been restored. Hony. Secretary to write and thank him.

Read letter from Mr. Nicolls dated November 12th giving 3 instances of great delay in telegrams between Davershola and South Wynaad.

Despatched from Perrindotty	November	10th, 2-20 p. m.
Received at Davershola	do	11th, 2-45 do
Despatched from Perrindotty	do	11th, 3- 5 do
Received at Davershola	do	12th, 9-10 a. m.
Despatched from Meppadi late fee paid Rs. 2.	do	11th, 7-15 p. m.
Received at Davershola	do	12th, 9- 7 a. m.

The Honorary Secretary was instructed to address the Postmaster-General on the subject. Also to ask that Cherambadi office may be put on the same time schedule as the other telegraph offices on the line, *viz.*, 10 a.m. to 5 p.m.

2283. CLOSING MAILS AT MEPPADI.—Read letter from Postmaster-General, dated November 17th to Honorary Secretary informing him that he had sanctioned the employment of an extra runner on the Meppadi Vayitri line in order to restore the former hours of closing mails at Meppadi. Recorded with satisfaction. The Honorary Secretary was instructed to thank the Postmaster-General.

2284. REGISTRATION OF VEHICLES IN MALABAR.—Mr. Gillatt informed the Meeting that he had been appointed Member of a Committee of the District Board of which Mr Moopil Nayar is Chairman to go into the subject.

2285. POODAPADY HOTEL.—Examined estimate for repairs sent by C. Chungaren amounting to Rs. 248. This was sanctioned; Mr. Gillatt promised to see that the work was properly carried out.

2286. LABOUR LAW.—Read Proceedings of Special General Meeting held on November 1st, memorandum drawn up by the Deputation appointed to interview the Collector of Malabar, letter to the Collector and account of the interview. The last has been submitted to Mr. Evans who has made one minor correction which is embodied in the report.

The Honorary Secretary said:—

"You appointed a deputation to see the Collector of Malabar. We "drew up the memorandum already published which I sent to "him with a covering letter.

"Mr. Evans has been away from Calicut and we ought not to "publish any account of the interview as there has been no "opportunity of submitting it to him for approval. But for the "information of members I may say that as far as our immediate object went the deputation was quite successful. "The order, which we were informed was one issued in the time "of Mr. Innes, but only recently enforced, that in the case of "a second conviction under clause 35 only a fine was to be "inflicted, which the Vayitri Magistrate held freed the prisoner "from further liability, has been withdrawn. Instructions have "also been issued that every effort is to be made to recover the "fines already levied.

"Mr. Evans however insisted on the correctness of the view that if "the prisoner was fined he could not be punished further "criminally. The latter part of clause 35 he declares only refers "to civil liability."

The deputation was thanked for its services.

2287. SUBSCRIPTION TO U. P. A. S. I.—Read letter from Honorary Secretary, to Secretary, U. P. A. S. I. Approved.

2288. PROPOSAL TO DIVIDE THE MALABAR COLLECTORATE.—Read letter from the Collector dated October 28th, 1916. After considerable discussion it was decided that this Association agrees with the Collector in thinking that North and South Wynaad ought not to be divided. We have no objection to the change of Head Quarters to Tellicherry. We consider that Vayitri is better situated for the Head Quarters of the Divisional Officer than Manantoddy. We are unable to offer any remarks on the effect of increasing the work of the Divisional Officer of Wynaad by adding the Kurumbranaad Taluq to his division.

The following resolution was proposed by Mr. Malcolm seconded by Mr. Whitton and carried.

"This Association proposes that if a division of the District is to take place, Wynaad be taken over by the Nilgiri District. South East Wynaad is already in that District and it would be more convenient to planting interests that they should all be under one Collector."

2289. MR. ANSTEAD addressed the Meeting on the subject of his present tour in Wynaad.

MR. MCRAE also addressed the Meeting. A very hearty vote of thanks was accorded to both speakers. The Chairman asked them to send copies of their remarks which they promised to do. These will be published as soon as received.

A vote of thanks to the Chairman concluded the Proceedings.

(Signed) J. S. NICOLLS,
Chairman.

(„) C. E. ABBOTT,
Honorary Secretary.

THE ORIGIN AND DISSEMINATION OF DISEASE IN CULTIVATED PLANTS.

Few subjects are so fascinating or so obscure as those which serve as the title for this article. Cultivated plants, like congeries of civilised human beings, appear to attract to themselves all the ills that flesh is heir to. In spite of, or because of, the attentions of the sanitary authorities, diseases continue to take their toll of cultivated plants and civilised communities, and all the measures of prevention which are devised serve for the most part only to stay the ravages of disease, and not to abolish them. It has been argued with some measure of cogency that this susceptibility to disease is the penalty which civilisation in the human community and its counterpart, cultivation, in the case of economic plants, pay for setting at naught the harsh decree of Nature, summed up in the formula of the struggle for existence; that things no longer left to take their gruelling from nature become soft and susceptible, so that they fall ready victims to epidemics of disease. Whether this be so or not the fact remains that the longer a plant is cultivated the larger appears to be the number of diseases to which it is apt to fall a prey. As time goes on new diseases, unknown to earlier authorities, make their appearance, and these new diseases not infrequently prove to be the worst. In certain cases it looks as though the agent of disease had trained itself for its new and fell work by a patient apprenticeship. Originally a harmless saprophyte living in decaying organic matter in the soil, the potentially pathogenic organism learns to attack the quick as well as the dead, and so bridges the somewhat narrow gap which separates saprophytism from parasitism. But in other cases this mode of origin of disease cannot be invoked, and the origin of such diseases, in so far as it relates to cultivated plants, remains a mystery. Now and again, however, a fact comes to light which is strongly suggestive that a new disease may be traced to its source or origin. Such, for example, is the striking fact discovered by Mr. Cotton that wart disease (black scab) of Potatoes may affect not only the cultivated Potato, but also wild species of Solanum, such as S. nigrum and S. Dulcamara.—*The Gardeners' Chronicle.*

RUBBER GROWERS' ASSOCIATION OF SOUTHERN INDIA.

As announced in our last issue a meeting of the local branch of the Rubber Growers' Association was held at Cochin on 25th November. The meeting was well attended and was in the nature of a Conference of Rubber Planters which in our opinion is what these meetings should be.

Apart from the ordinary business of the Association two subjects were brought up and afforded a most interesting basis of discussion. Mr. McRae, the Government Mycologist, was present, and kindly gave a lot of valuable information.

The first was the subject of Pink Disease and its treatment. It was complained that though several estates had been applying Bordeaux Mixture as a preventative of Pink Disease for the past three years the results were not satisfactory. For example a 1911 clearing after careful treatment had 18% of the trees attacked. Another estate had -5% of cases in its treated area and only 3% in the untreated area.

Mr. Anstead pointed out that no better method of treating Rubber for Pink Disease had as yet been suggested and in all cases where figures were given it was difficult to say how bad the disease would have been had the area not been treated. Undoubtedly more work should be done on this method of treatment which was still only experimental. Bordeaux Mixture was entirely a preventative remedy; it could not touch the fungus once it had gained an entry into the trees. What was needed was to find out when the fungicide should be applied and how often. It was more than possible that at present it was not applied at the right time and that in cases where such disappointing results were obtained the fungus had already got into the trees and the remedy was applied too late. He wished to see the matter taken up by a number of estate on large areas in a systematic way and he felt sure that if Bordeaux Mixture could be applied at the right time it would have a beneficial effect.

It had been complained by some planters that the method was not practical on account of shortage of labour and shortage of water. In such cases there was no more to be said and the old method of cutting out and tarring would have to be relied on to keep the disease under control. But these conditions did not apply in all cases, and where they did not he still advocated Bordeaux Mixture.

With regard to cost, the work had been done on one estate to his knowledge at Rs. 2/8 per acre containing 136 trees to the acre. This left a big margin of profit, for the damage done was very considerable.

Mr. McRae, the Government Mycologist, pointed out that Pink Disease was a fungus which worked inside the bark and spread for a considerable distance above and below the spot where it burst through the bark to produce spores and make the well-known "canker" spot. The consequence was that great care must be taken when cutting it out to cut away a sufficient portion of the diseased branch below the "canker" spot. How far this was he could not say as he had made no special study of the disease, but it might be roughly put at three feet. It had been pointed out by some present that the disease had broken out again after excision even round tarred areas and in this case probably it had not all been removed but some of the mycelium left in the stem below the cut which, when conditions become favourable, had gone on growing.

He favoured the application of Bordeaux Mixture. It was the best and most efficient fungicide known and no fungus could grow in its presence, but once the fungus had got into the stem no known fungicide could get at it.

In a case of this sort it was very hard to get reliable figures which would show the effect of a remedy and he considered those quoted as quite useless. The experimental error was in all such cases very high, how high it was impossible to say, but it was bound to be large and the utmost care must be taken in choosing the situation of experimental blocks and check areas if reliable figures are to be obtained. Such blocks should not be chosen near boundaries or jungle, or outside vitiating factors would come in. The control blocks should be under exactly the same conditions as the treated blocks, of the same size, in the same position on the estate, and with similar facings and relation to boundaries and jungle. Reliable experiments designed to give figures of comparison in a case of this sort were extremely hard to arrange.

Finally the following Resolution, proposed by Mr. Anstead and seconded by Mr. J. R. Vincent, was passed.

"That in the opinion of the Local Branch of the South India Rubber Growers' Association more investigation is required as to the efficacy of Bordeaux Mixture for preventing Pink Disease and it invites the co-operation of all Rubber growing Districts in the matter."

It is hoped that all Rubber planters having experience of the method, or of Pink Disease in general, will communicate their experiences to the Scientific Department of the U. P. A. S. I. and that experiments will be undertaken to find out the proper time, or times, to apply the remedy.

The second subject discussed was the abnormal leaf fall of Rubber.

On this subject Mr. McRae kindly addressed the Meeting, speaking as follows :—

"I have little further to add to what I had the honour of putting before the Annual Meeting of the United Planters' Association of South India in Bangalore in August. The sexual spores of the fungus that is attacking Hevea so generally in South India have been studied in pure cultures of the fungus since February last and were at length found on fruits and seeds on an estate in October. They develop towards the end of the fruiting season. They are thick walled, spperical, and considerably larger than the swimming spores produced so copiously during the monsoon. They are resting spores and are well suited to live over the dry season. They have not yet been induced to germinate, but doubtless behave as those of other members of this group of fungi that have been longer studied and may be assumed to be one of the starting points for the development of the fungus when the rains begin in an ensuing season.

"2. There are three points to be considered in designing preventive experiments.

(1) The fruits form the propagating centres of the fungus during the monsoon.

(2) The fungus is carried over the dry season in resting spores found in the diseased fruit and on decayed seed.

(3) and also in the mycelium that remains alive in the dead branches in the region between dead and living tissues.

If the fruits are removed, or are protected from the fungus during the monsoon, then the rapid development and spread of the disease on an estate will be checked, and if those parts that contain the living fungus or its resting spores in the dry weather can be destroyed, then the points of reinfection for the next moist season will be absent.

"3. With regard to the first point this might be done in several ways.

(1) by reducing the fruiting capacity of the tree.

(2) by removing or destroying the flowers.

(3) by spraying the fruits or by removing them, before the monsoon commences.

"The Government Economic Botanist was good enough to visit two rubber estates with me with a view to see whether some means of reducing the amount of fruiting of Hevea trees could be devised, but this line seems impossible.

"To cut off the bunches of flowers would not be difficult so far as the manipulation is concerned, but it would require much time.

"To spray the flowers with a solution of some chemical such as copper sulphate is possible but probably impracticable. It is not the chemical nor the means of spraying that is the difficulty, but the labour and supervision involved in applying the spray. If either of these two courses could be adopted then the fruit problem would be solved as none would ever develop.

"To spray the fruits just before the monsoon with Bordeaux Mixture as a means of protecting them against the attack of the fungus would be as difficult as to spray the flowers. Spraying fruits with Bordeaux Mixture against the attack of a related fungus on the fruits of the arecanut palm has led to excellent results. The arecanut fruits, however, are grouped in from one to three bunches close to the trunk of the tree, just under the crown of leaves. Thus the application of Bordeaux Mixture is comparatively easy. But as the fruits of Hevea are scattered a few here and there over most of the young branches of the tree the difficulty of spraying on trees of any size is greatly increased.

"4. For the present these methods may all be left aside, though I have no wish to discourage anyone who would like to try them, and an attempt may be made to remove fruits before the monsoon begins and bury them. Dead wood and decayed fruits on the trees and on the ground must be removed and burned. There is no alternative here.

"5. This ought to be tried on a large scale on blocks of at least 100 acres in order to find out the amount of good it will do and the cost."

After some discussion the following areas were offered for experiment during the coming year:—

500 acres on Mooply Valley Estate.
100 acres offered by Mr. J. R. Vincent.
100 acres offered by Mr. Barton Wright on Pudukad.
100 acres offered by Mr. J. C. Stewart.
100 acres offered by Mr. S. P. Eaton on Pullangode Estate.

It was agreed that Mr. Anstead and Mr. McRae should draw up and circulate to the Managers of these Estates a careful programme of the experimental work which they wish to have carried out. This will be done and the programme will also be published in the pages of the *Planters' Chronicle* so that any other planters who wish to do so may carry out the experiment. It need hardly be pointed out that the more places in which the proposed experiments are carried out the more likely are reliable results to be obtained and the point settled once for all whether the methods of control suggested will prove successful and whether they are practical on an estate scale.

The Rubber Growers' Association are to be congratulated on having made a decided step in the right direction with regard to this disease and the experiments proposed will be on by far the largest scale of any experiments as yet undertaken in Southern India.

RUDOLPH D. ANSTEAD,
Deputy Director of Agriculture, Planting Districts.

MARKETS, PRICES, AND STATISTICS.

Coffee.

Monthly Statistics to 31st October.

	1916. Tons.	1915. Tons.
East India—		
Landed to 31st October	2,162	3,737
Delivered to 31st October	2,491	3,336
Stock on 31st October	1,057	1,840
Coffee of all kinds—		
Stock in U. K. on 31st October ...	39,750*	34,250
European imports 31st October ...	309,755	407,260
European deliveries to 31st Oct. ...	285,220	454,650
European stock on 31st October ...	230,650	208,235
World's visible supply ...	622,235†	615,765

* The real stock must be considerably larger as there are quantities of "Prize" Coffee at outlying ports which are not included in the warehouse returns.

† An increase of 47,645 tons compared with an increase of 34,765 tons last year.

Brazil receipts to 6th November have been :—

1916.	1915.	1914.	1913.
6,553,000	7,695,000	4,417,000	7,743,000

Offerings at auction have been :—

—	24th Oct. 7th Nov.	Since 1st Jan.	Last year.
East India	1,139	28,241	41,853
Costa Rica	553	95,635	102,660
Other Milds	2,288	73,935	154,475
Brazil	7,239	103,266	115,740
Robusta	Nil.	1,453	13,410
B. E. A. & Uganda	1,174	16,580	11,233

Messrs. T. H. Allan & Co's Weekly Report dated 8th November states that some East Indians which had not been previously offered were brought forward, but only part, mostly the lower grades, sold at steady prices. The market generally has been very quiet. A trifling business has been done at 74-C. i. f. Marseilles, but freight difficulties stand in the way. "Native" would be readily saleable in France for January—March shipment at slightly higher prices than "Plantation."

The Mysore Chamber of Commerce Weekly Report dated 27th November states that there is still no local demand and prices are more or less nominal. Price per maund of 26½ lbs: Peaberry ranges from Rs. 14 to Rs. 16; Parchment, Rs. 11/4; Native, Rs. 10/8. Chickmaglur quotes Peaberry, Rs 14 to Rs.14/8; Native No. 1, Rs.11 to Rs.11/8; Native No. 2, Rs. 10/8 to Rs. 10/12 per maund of 28 lbs.

Tea.

The following figures are published by the Indian Tea Association showing the Exports of Tea during the month of October.

	1916.	1915.
Sailings to Great Britain—	lbs.	lbs.
From Calcutta in October	... 15,933,532	29,523,506
From Chittagong in October	... 12,272,215	11,933,545
From 1st April to 31st October	...132,160,547	142,492,063
Sailings to Australia and New Zealand—		
In October	... 1,247,109	982,913
From 1st April to 31st October	... 3,233,256	6,006,958
Sailings to America—		
In October	... 467,855	1,950,627
From 1st April to 31st October	... 2,799,927	6,284,280
Sailings to Other Places—		
In October	... 9,644,104	6,148,272
From 1st April to 31st October	... 27,926,952	22,776,050
Sailings from South Indian Ports—		
In October	... 2,710,956	2,137,191
From 1st April to 31st October	... 11,862,268	12,978,168
Total Sailings—		
In October	... 42,275,771	52,676,054
From 1st April to 31st October	...277,882,950	190,537,519

The following were the sailings from South Indian Ports during October:—

		lbs.
Cochin—		
To London	...	623,165
To Asiatic Ports	...	10,549
Tuticorin—		
To London	...	211,280
To St. John N. B.	...	464,654
To Colombo	...	67,695
Alleppey—		
To Asiatic Ports	...	3,727
Calicut—		
To London	....	1,307,110
To Bombay	...	18,071
To Kathiwar	...	515
To Colombo	...	4,190
	Total...	2,710,956

The Export of Tea from Ceylon from 1st January to 20th November was Black, 173,914,773 lbs; Green, 3,494,310 lbs. the corresponding figures for 1915 being 181,746,179 lbs. and 4,397,104 lbs. respectively.

The following shipments of Tea were made from India to Russia during October:—

	lbs.
To Petrograd	369,209
To Irktisk	223,855
To Moscow	4,070,208
To Odessa	351,358
To Baku	34,155
To Vladivostock	459,640
To Tschelianbinsk	1,620,505
To Stretensk	12,597
To Kokond	18,222
Total...	7,159,649

The following prices were obtained for South Indian Teas at the London sales of 6th and 8th November:—

—	B.O.P.	O. P.	B. P.	Pek.	P. S.	Fgs.	Dust.
TRAVANCORE.							
Sirikundra ...	11¼	...	...	10	9¾	10½	...
Sevenmallay ...	1/1¼	11¼	1/-	10¾	10½	...	...
Ladrum ...	...	...	10½	10¼	...	11½	...
Bon Ami ...	11	...	10¾	10	9½	...	...
Gundamallay ...	...	...	1/-	...	...	11¾	...
Kaduwakarnum ...	11¼	...	...	9¾	9½	...	...
Haileyburia ...	11¼	...	10¾	10	9½	...	...
Stagbrook ...	11	...	10¾	10	10	...	...
NILGIRIS.							
Rob Roy ...	11¼	11	10¾	10½	...	...	...
Deverashola ...	...	...	11¼	10¼	10½	...	...
Prospect ...	1/1	...	1/-	11¼	...	...	...
Woodbriar ...	11¼	10¾	10½	9¾	9¼	...	...
WYNAAD.							
Arrapetta ...	11½	10¼*	10¾	10	...	...	10¼
Audatode ...	11	10½	10¼	9¾	9¼	10¾	...
Nellimunda ...	10½	9¾	10¼	...	9¾	...	...
ANAMALLAIS.							
Paralai ...	11½	...	10¾	...	10¼	...	...
Stanmore ...	11	...	...	9¾	9½	...	...

The Tea Market showed an active demand at higher prices. The loss of the "Clan Leslie" and another steamer has no doubt made buyers nervous about supplies.

Rubber.

There has been a firm market and during the few day about 8th November it was influenced by the shipping losses. On 9th November Crepe was 2/7¾ and Smoked Sheet 2/7¼.

Spices.

Pepper.—The home market is firm but quiet. Fair Tellicherry 9½*d.* In the local market prices range from Rs. 13 to Rs. 14 per 25 lbs.

Cardamons.—There is nothing doidg in the home market. In the local market prices range from Rs. 24 to Rs. 30 per 25 lbs.

R. D. A.

A MYSORE PEST ACT.

In the Mysore Legislative Council on the 5th instant Sirdar M. Kantaraj Urs, the First Councillor, moved for leave to introduce a Bill to prevent the spread of plant disease in the State. In doing so he said:—

The subject of harmful insects and pests has been receiving great attention in the West in recent years. As early as 1877 a statute was introduced in England for preventing the introduction and spreading of an insect known as Colorado Beetle destructive to crops. Under subsequent statutes orders could be made for preventing the introduction into Great Britain of any insect, fungus, or other pest destructive to agricultural or horticultural crops or trees or bushes. Similar enactments have been passed in Canada, United States of America, Australia, South Africa, etc. for the prevention and spread of thess veritable "undesirables." In 1914 a Destructive Insects and Pests Act was also passed in British India.

So far as our own State is concerned, in the interest of Agriculture, it has been frequently represented to Government that in the case of certain infectious plant diseases like Kole-Roga, Green bug, and Kumbli hula pests, the need for some means of enforcing-co operation for remedial measure among the ryots is very keenly felt. Though some of the ryots may carry out the recommendations of the experts in the matter, the good results achieved by them are more or less completely nullified by the apathy of others. The representation is not the outcome of a single case of indifference but of innumerable instances. The danger resulting from the spreading source of these diseases is reported to be very great, and unless some such measure as is now contemplated is introduced, the consequences will be disastrous. Hence, a small bill is proposed to be introduced to prevent the spread of such diseases.

Under the Bill it is proposed to vest in the Government the power to notify if any specified area is being infected and the power to frame rules for the instruction, disinfection and destruction of diseased articles, and for regulating the powers and duties of the officers employed in this duty and generally for the carrying out of the objects of the Bill. A breach of the rule or order is made punishable only with a fine. The details of the Bill may be considered by the Select Committee. I request that, as there is a great and urgent necessity for this uneasing, leave to introduce it may kindly be granted.

Mr. C.S. Balasundrum Iyer, Deputy Commissioner of Tumkur in Seconding the motion, said that legislation on the lines covered by the proposed Bill was very necessary to prevent the ravages of insect and other pests and Dewan Badadur K. P. Puttanna Chetty said the green bug had appeared in Bangalore and if not eradicated the tendency would be to overwhelm the fruit culture of the district.

The motion was unanimously passed.

A federation of British Industries has been formed to provide a body capable of representing the interests of the British manufacturing and producing industries. The objects of the federation may be summed up briefly as the organisation and development of industry now and after the war, in co-operation with labour and in conjunction with the Government and Government departments. The federation will at once concern itself with the reconstruction of British trade after the war; the development of sources of supply of raw materials; and questions arising out of the transition from war to peace such as measures to mitigate possible unemployment during that period. Every effort is to be made to ensure that in future no important action affecting British industry shall be taken by the Government without due weight being given to the views of manufacturers. A condition of membership is an annual subscription until June 30, 1919. Mr. F. Dudley Docker, C.B., is the president of the federation.—*Nature.*

The Planters' Chronicle.

RECOGNISED AS THE OFFICIAL ORGAN OF THE U. P. A. S. I., INCORPORATED.

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THE U. P. A. S. I.

(INCORPORATED.)

Contents.

The Deputy Director of Agriculture, Planting Districts, is on tour in Coorg and will probably return to Headquarters before Christmas.

We publish the proceedings of the Quarterly Meeting of the South Travancore Planters' Association and the Minutes of an Extraordinary Meeting of the Annamalai Planters' Association. The latter is of local interest but the former contains a resolution on Freights which is receiving the earnest attention of the Chairman, who has taken great personal interest in the matter, having interviewed Firms when at Cochin last month. A circular may shortly be expected from him. As this subject is occupying the foremost place in the minds of all planters we have republished an article from *Fairplay*, the London Shipping Journal, which will give some idea as to the loss of tonnage and a suggestion as to its remedy and replacement.

We publish the first instalment of the Deputy Director's Tour, which will be continued. Mr. McRae, who accompanied him, spoke, as usual, interestingly on the subject of parasitic fungi.

We have much pleasure in publishing a letter from the Honorary Secretary, Mundakayam Amateur Dramatic Society, and the accompanying Balance Sheet of the War Fund Concert. We welcome the "frivolous" at all times, but especially so when accompanied with so handsome a subscription towards the South India Planters' War Fund.

We publish an appeal to all Planters on behalf of the Salonica Hospital at the request of Mrs. Thomson and we could not read it without being moved. Any subscription should be sent direct to Mrs. Thomson who will acknowledge it.

SOUTH INDIA PLANTERS' WAR FUND.

	Rs.	A.	P.
Amount previously acknowledged	55,687	8	2
Total...	55,687	8	2

DISTRICT PLANTERS' ASSOCIATIONS

South Travancore Planters' Association.

Proceedings of the Quarterly Meeting held at Quilon Club on Monday, 27th November, 1916, at 10-30 a.m.

PRESENT:—Messrs. J. B. Cook (Chairman),, J. Stewart, R. Ross, H. S. K, Morrell, J. A. Anderson, L. G. Knight, R. Branson, R. J. A. Moore, C. Hall, J. L. Hall, A. W. Upcher, J. O. Gray, T. L. Jackson, C. E. L. Lister, W. G. Thom, R. N. W. Jodrell, G. McPherson, and L. A. Lampard (Honorary Member). *Visitors*,—Messrs. J. Mackie, E. Lord, J. Wood, J. L. Henderson and L. E. Young.

Notice calling the meeting was read.

CHAIRMAN: Before proceeding with the business of the meeting I regret to state that two more of our members have given their lives for King and Country—Messrs. J. H. Parkinson and C. Searancke—the former was killed in the battte of the Somme on 2nd July in the big advance, and the latter was drowned while serving on H. M. S. "Russell." I propose that this Association send a letter of regret and sympathy to their nearest relations. I would also like to record our regret at the recent sad death of Mr. C. A. Lampard. You will know what he has done for the Rubber industry and how much we are indebted to him for the large acreage opened in South India. His loss will be greatly felt by all present. he was so well known and esteemed that I need say no more. Passed all standing.

Minutes of last meeting were read and confirmed.

As the late Honorary Secretary Mr. A. W. Leslie, resigned on being tranferred to North Travancore it was resolved that Mr. Cook continue to act in this capacity till the Annual General Meeting on 2nd February 1917.

BANGALORE DELEGATE'S REPORT.—Mr. Leslie's report was read as follows:—"Mr. Chairman and Gentlemen,—As your Delegate. I attended the annual meeting of the U.P.A.S.I. in Bangalore from 14th to 17th August last. This Conference was well attended and all District Associations fully represented.

I had no special subject from you to bring up at this meeting and as most of the other Association Delegates Reports have been published in the *Chronicle*, there is very little left for me to add. I seconded a proposal by Mr. Richardson regarding the Book of Proceedings and as this item appears on your Agenda to-day, you will have an opportunity later on to discuss the resolution. An interesting point was raised regarding the election of the Planting Member and afterwards clearly understood that the voting was one vote, one member, and not according to the members voting power, as was thought by several, I think, at your Meeting last July Mr. Anstead I believe will be with you on the 28th instant and I understand is to arrange a definite date to visit the districts decided on at our last meeting.

The lectures given by Dr. Coleman and Mr. McRae and which appeared in the *Chronicle*, were very interesting and have, no doubt, been read by most of you.

I would invite your attention to the appeal made on behalf of the St. George's Homes and the stirring speech by the Rev. F. Breeden convinced one that this Institution deserves our immediate support.

In conclusion, gentlemen, I thank you for the honour you did me in electing me as your representative."

U. P. A. S. I. Book of Proceedings.—Proposed by Mr. C. Hall and seconded by Mr. J. Stewart.

"That the necessary number of copies of the Book of Proceedings be procured and distributed to the members free of charge."—*Carried.*

Rubber Thefts.—The matter was discussed, and decided that the Honorary Secretary obtain information from the members as to native holdings in the various divisions, giving owners name, acreage, date of planting, crops harvested if possible. Such information to be forwarded to the Honorary Secretary, Travancore Combined Planters' Association.

Subjects for Sree Mullam Popular Assembly.—It was finally decided that the delegate should speak on the subject of Roads and an Outlet Port.

Sree Mullam Delegate.—After some discussion Mr. Chas. Hall kindly consented to represent the Association at the Popular Assembly.

Rubber Growers' Association.—Resolved that Mr. J, Stewart continue to be our representative at the meetings of the R. G. A. for 1917.

Travancore Combined Planters' Association.—Resolved that our Chairman and Honorary Secretary for 1917 represent us at the T. C. P. Association meetings for that year.

South India Freights.—The following resolution proposed by Mr. J. Stewart and seconded by Mr. R. Ross was carried unanimously :—

"That the Association views with very great concern the enormous increase in freight rates and would ask the Chairman of the U. P. A S. I. to take the matter up with the Indian Tea Association in London with a view to representations being made to the Home Government."

An average Tea Estate already provides Government with about £40 per acre per annum in the way of direct taxation and it is feared that with this extraordinary increase in freight, profits will entirely disappear.

If as seems likely Government will fix a standard price for a national commodity like Tea, the position would appear to be most serious and we would ask that the parent Association wire the Indian Tea Association immediately and move Government to fix a rate limit and arrange for a regular supply of freight. It should also be pointed out that South Indian Tea is at very great disadvantage over Northern Indian Tea, where a rate of something like 45*s*. per ton of 50 cubic feet has been definitely fixed from Calcutta for Tea until after the War.

Correspondence.—Letters *re* visit of the Deputy Director of Agriculture were read. Mr. Stewart having met Mr. Anstead at Cochin on the 25th November had arranged early March for the visit.

Mundakayam Planters' Association.—Read the Honorary Secretary's letter of 24th October 1916, and decided to ask the Mundakayam Association to let their delegates to the Annual General Meeting of the Travancore Combined Planters' Association to discuss with our delegates the subjects of a future policy for use in any further labour disputes between members of the two Associations.

Read correspondence on refund of Tea Export Duty.

The meeting then closed.

(Signed) JOHN B. COOK,
Chairman.

The Anamalai Planters' Association.

Minutes of an Extraordinary Meeting of the Anamalai Planters' Association held at the Club on 14th November, 1916.

PRESENT.—Mr. J. H. Robinson (in the chair) Messrs. Behr, Marsh, Scott, Simcock, Cooper, Dobbie, Cotton, Jeffery, Sladden, House, Turner, Jones, J. O. K. Walsh, H. N. F. Walsh and A. A. Robb (Hon. Secretary) Mr. Carless was represented by proxy.

AGENDA.

1. Minutes of previous meeting were read and confirmed.

2. LABOUR SITUATION. (including Criminal Tribes).—The meeting resolved itself into committee to discuss this matter. In open meeting, the Secretary was requested to call an Extraordinary General Meeting on 28th November, 1916, to again discuss this matter.

Mr. Simcock's report on the Labour Delegates meeting at Ootacamund was read and he was heartily thanked for attending meeting.

3. LEGAL MATTERS.—The following resolution proposed by Mr. Cotton seconded by Mr. Robb was passed unanimously:—"That as cases are at present frequently heard and dismissed by the Sub-Magistrate at Pollachi without giving any notice to the complainants, the District Magistrate be asked to pass orders that all cases in which any Anamalai Planters are concerned be posted for hearing by the Sub-Magistrate at Iyerpadi, whether they be contested cases or not."

Mr. Congreve's remarks in reference to passed decrees were recorded.

4. WESTERN OUTLET.—The Honorary Secretary was instructed to write to the Dewan of Cochin and ask that gentleman whether it would be convenient for him to meet the Guarantors at Coimbatore on 2nd December, 1916.

5. BRANCH ROADS.—The following resolution proposed by Mr. Scott and seconded by Mr. Congreve was passed unanimously. "That the D. P. W. Executive Engineer be asked why the work of repairing the Stanmore Branch Road had not been completed seeing the work was commenced early in October."

6. POST OFFICE.—Letter from the Superintendent of Post Offices was read and recorded. Several other complaints were made by members in regard to lack of stamps etc., in the post office and the Hony. Secretary was instructed to write to the Superintendent of Post Offices and put these complaints before him.

7. COFFEE STEALING.—Resolved that this Association do approve of the rules proposed by the Collector at Salem.

The Meeting terminated with a vote of thanks to the chair.

(Signed) J. H. ROBINSON,
Chairman.

(„) A. A. ROBB,
Honorary Secretary.

DEPUTY DIRECTOR OF AGRICULTURE'S TOUR.

Leaving Bangalore on 15th November, Mr. R. D. Anstead, M.A., Deputy Director of Agriculture, Planting Districts, accompanied by Mr. W. McRae, M. Sc., the Government Mycologist, made a tour of the Wynaad District and visited the following estates:—Daverashola, Wentworth, Cherambadi, Arrapetta. Panora, Nellimunda, On 22nd November these officers attended a Meeting of the local Planters' Association held at the Meppadi Club and both of them lectured on agricultural matters of local interest, They then proceeded to Cochin to attend a Meeting of the local branch of the Rubber Growers' Association the proceedings of which were reported in the last issue of the *Chronicle*. From Cochin Mr. McRae returned to Coimbatore and Mr. Anstead to Bangalore, reaching head-quarters on 30th November.

Brown Blight of Tea.

In the *Planters' Chronicle, Vol XI, p. 2* an article on this subject was published, describing the disease and making certain recommendations for its control. Last November an area of some 20 acres, badly attacked by the fungus, was placed at the disposal of the U. P. A. Scientific Department for Experimental purposes. At that time the bushes were very badly attacked by the blight and largely defoliated, the leaves still remaining on them nearly all showing the characteristic brown spots, The wood had become thin and whippy leaving nothing to prune on to, and the whole field had a poor appearance, the soil being easily seen between the bushes. A certain number of trees which had been almost killed by the disease had been collar pruned, but the young suckers were attacked and killed back as soon as they appeared.

The area was put under special treatment and on inspection this year showed a remarkable improvement. The foliage had been restored and the ground was now completely covered where before it was exposed between the rows of bushes, the character of the wood had changed, and the bushes were growing rapidly. The disease was still present, but as far as could be seen there was no more on this area now than on the rest of the estate.

The following is a brief summary of the methods of control adopted on this area:—

The field was forked four times, in November, January, July, and September, the weeds being buried in November, July, and September. In August it was grass knifed and clean weeded round the bushes, and in October it was weeded again and the weeds collected. The object of all this cultivation was to get rid as far as possible of the fallen leaves covered with spores to prevent reinfection, and by thorough aeration of the soil to keep the tea growing. The roads and drains were cleaned twice.

In January slaked lime was broadcasted and worked into the top soil at the rate of 10 cwts. per acre, and in September Basic Slag was put out broad cast at the rate of 5 cwts. per acre.

The field was sprayed with Bordeaux Mixture three times, in February, March, and May, and all the time diseased leaves were picked off, collected, and burned. There were three rounds of this picking resulting in the collection of 17,269 lbs. of leaf.

The Dadap green dressing which is permanent was lopped and mulched where available.

The system of collecting the diseased leaves has been adopted with a great deal of success over the whole estate, 40,122 lbs. of leaf having been brought in and burned during the year. Children and others are employed in this work who would not otherwise work on the estate, and a cash payment is made per given weight of leaf collected. Where labour is available this is undoubtedly an excellent means of control of this disease as the leaves are picked off and destroyed before the spores are produced and distributed from them.

On another estate visited in December last year the blight was very bad on a nursery. Some 175,000 plants were endangered and so bad was the attack that it was proposed to destroy the whole nursery. Instead of this, however, it was cleaned up and sprayed, and treated exactly as recommended in the *Planters' Chronicle* of January last. As a result the nursery was saved and the plants have been put out in the field.

These two experiments may be considered eminently successful and the recommendations laid down in the article in the *Chronicle* referred to may be taken as the correct method of control of this disease.

Special care should be taken in nurseries which are easy to treat, and a special cooly should be put on to go over the beds continually and pick off all diseased leaves showing the characteristic brown spot as soon as they appear. All nurseries should be sprayed with Bordeaux Mixture either before the plants are put out in the field or as soon as they have been put out. Probably the former plan is the easier in actual practice.

All seed should be disinfected before it is sown with Formalin. While Brown Blight is not likely to be carried on the seed there are many fungi that are so carried and it is a matter of ordinary wise precaution in estate practice to adopt disinfection methods which are cheap and easy to perform.

At the Meeting of the Wynaad Planters' Association held at the Meppadi Club on 22nd November, Mr. W. McRae, the Government Mycologist spoke as follows about this disease :—

"In my present tour with Mr. Anstead of certain Tea estates in the Wynaad I have seen several fungi parasitic on Tea, but none of them is causing any general damage. Brown Blight and Grey Blight are the most common, while the others are mostly leaf spots found very occasionally and at present of interest to the Mycologist rather than the planter."

"Brown Blight I have seen on all estates. and Grey Blight on most. Usually a few infected spotted leaves are found on bushes here and there and that is all. In some fields, however, the blights are more prevalent and though usually not severe enough to warrant active measures yet they need watching. In one place I was told the blight had been more prevalent two months before on a fair proportion of the estate, and that the leaves had fallen off, and this seemed to be warranted by the thinness of the cover of leaves and the presence of the fungus on some of the fallen leaves still to be found. It is probable though that in this case other causes have helped to bring the bushes into the weak condition in which they were. From all accounts these blights have been in Wynaad for many years and do not do much appreciable harm, but occasionally, probably when a block of tea is rather run out from over flushing or injudicious pruning, or some such reason, they cause a considerable amount of loss locally."

" On the surfaces of the spots tiny black dots can be seen and these are groups of spores of the fungus. In Grey Blight the dots are considerably larger than those in Brown Blight. The spores are very minute and can easily be blown or carried in raindrops from leaf to leaf, or by clothing and implements of coolies. When a spore has alighted on a leaf and the thread or threads that grow from it have penetrated the leaf they enter the living cells, absorb their contents as food and kill the cells which ultimately become brown. They penetrate further into the leaf tissue, killing the cells as they go and so form the brown spot visible to the naked eye. When the fungus is well nourished its threads come together into little tufts which burst through the epidermis or skin of the leaf and produce spores which appear as tiny black dots. It is this destruction of the leaf tissue that causes the important damage to the leaf. As you know the sap that comes up from the roots passes into the cells of the leaf and is there worked up into those substances that the plant uses for building up all its structures, roots, stems, and leaves. If this food-making machinery, if I may use such an expression, is reduced to any considerable extent the supply of food that the plant can use for its growth is curtailed and there is not enough to make good wood and leaves. Thus you see how it is that only a few infected leaves on a mature bush do not affect it much, while a large number of infected leaves affect it considerably, and how it is that an infected seedling or a young shoot from a healthy pruned bush suffers so badly."

" Two cases I may mention. One in the field and the other in a nursery, and both have been successfully dealt with by the planters concerned. In the one case a block of about 20 acres was very badly attacked by Brown Blight last year; the diseased leaves had fallen, the wood was whippy and left nothing to prune back on. It was well cultivated and sprayed three times with Bordeaux Mixture between February and May this year and the spotted leaves were picked off in large numbers. The result is that the bushes are well covered with leaves, the wood is improving, and there is very little blight. There are some leaves with the brown spots on them still, but these are no worse than any other block on the estate."

" In the other case a nursery was so badly attacked by brown Blight that it was almost scrapped. The spotted leaves were picked off and the plants were sprayed with Bordeaux Mixture. The result was that the plants recovered and 175,000 of them were planted out. I saw some of the plants in the field a day or two ago and though they are not yet free from blight they look well. There is no doubt that this treatment is sufficient both in the field and in the nursery. It has to be done thoroughly and needs supervision in the application."

" When a nursery has become badly attacked by Brown Blight and has been dealt with by spraying I would recommend that the plants be again sprayed after planting out if the attack still continues. But a nursery should never be allowed to become badly infected. Even when at a casual glance the seedlings seem all right the blight may be found by bending the plants aside and looking at the lower shaded leaves. A planter has to decide by his experience of the blights in the district what the degree of infection is that may be safely passed over and when the time comes for active measures against the blight either by removing and burning spotted leaves or by spraying, or by both."

(To be continued.)

FREIGHT.

Fairplay, the London Shipping Journal, writing on 2nd November, says:—

"There is a disease which needs to be treated with an operating knife rather than a rose-water syringe, and that is loss of tonnage by war and ordinary marine risks. In the House of Commons, the other day, the President of the Board of Trade, in referring to this matter, stated that no less than 2,000,000 tons gross of British tonnage had disappeared, equal to about 3,000,000 tons dead-weight. That amount in round figures represents a loss of about 10 per cent. of the tonnage under the British flag before the war, and, whatever way you look at it, makes a very serious hole in our assets. It is true that we have been able to some extent to replace this tonnage by the capture and use of enemy steamers, which are doing good work for this country and our Allies, by new tonnage, and by the chartering of neutral boats, but, as far as my calculations go, the tonnage lost by shipowners all over the world as a result of hostilities, totals about 3,250,000 to 3,500,000 tons gross, or practically 5,000,000 tons dead-weight. And, assuming that these vessels could make three voyages a year out and home, and would mean a diminution in carrying capacity of 15,000,000 tons of cargo each way, which could not but have an exceedingly serious effect, both upon the freight market and also upon the value of steamers, when peace is declared.

The logical conclusion (which shows how absurd logic can be) of the whole matter is that, if hostilities only last long enough, there is a possibility, however, bare, of our finding ourselves without a mercantile fleet when the war is over and of undergoing a most undesirable amount of stomach pressure before we win. And what is the remedy? Obviously to make our power felt as much by Germany as she is trying to make hers felt by us—and the proper use of the Navy is the medicine which we have ready to hand. To-day the papers are teeming with horrified abuse of Germany for her submarine policy against neutrals, she is being held up as *anathema maranatha* for the wholesale sinking of vessels which might be useful to the Allies in the carriage of food-stuffs and munitions of war. I agree that Germany cannot justify her actions in sinking vessels without warning, thus endangering the lives of men, women, and children, but she is allowed by international law, as laid down in various declarations and conventions, to destroy boats which she cannot possibly take into her own ports to await condemnation or release by a prize court. And she has been sensible enough not only to act up to her rights, but to interpret them (they are very nebulous) according to the measure of her own needs, and, where neutral interests and her own conflict, to recognise that charity begins at home, and that, where an enemy is concerned, it is her duty to seek out and destroy, paying, of course, for any mistakes that may unfortunately occur.

To Germany the rights of neutrals are at the worst nothing more than an expensive incident. We, on the other hand, when it comes to the question of enforcing a blockade, deliberately set up a maze of legal entanglements, and even then, instead of driving our way through them, seek to satisfy some remnant of what we are pleased to think a conscience by laboriously working round to the rear without for one moment considering whether or not our action is prolonging a way in which we are fighting for our life. We are trying to fix a small, hard collar on to a wobbly stud in cold weather with a numbed thumb. Germany allows herself to be hampered by no such sickly scruples. Within her means she sinks every

ship of every nation (she is naturally going for the weakest first), sending merchandise to our ports. Why do we not do the same, it would be costly, but it would mean speedy salvation and would pay us in the end? It is our clear duty to ourselves and to our allies to refuse to allow any commodities of any kind to go to any nation, if it is directly or indirectly supplying the enemy with the means of carrying on the war. The value of tonnage sunk since Germany went berserk must be in the neighbourhood of two hundred millions sterling, without counting the value of the cargoes carried by those vessels. Every day that the war is prolonged means the expenditure of many millions, and as a mere business proposition it would be far better for us to pay damage up to the hilt to neutrals for the stoppage of their supplies than to allow goods to filter through those countries to our damnification. We can, if we choose, sweep the seas bare of everything sailing upon it. If Germany were in our shoes nothing would have prevented her from using that power, the only difference between us and her being, that when the time came to settle the damages she would refuse to pay, and we should meet our liabilities.—*Bombay Market Report and Trade Journal.*

The following communication has just reached the Secretary, U.P.A.S.I. from the Secretary, Mysore Chamber of Commerce:—

In reply to your letter of the 26th August, asking me to let you know what subscription is due to this Chamber by your Association. I beg to inform you that the Committee at their meeting held on the 7th instant decided that public bodies or Associations who have obtained representation on this Chamber are to be exempted from the payment of subscription.

Mr. E. P. Meinecke, in U S. Dept. Agric. Bulletin, No. 275, entitled "Forest Pathology in Forest Regulation," gives the results of an investigation, as regards the incidence of wounds and disease, of 160 felled trees of *Abies concolor*, varying in age from 60 to 258 years. These trees were representative of the ordinary condition of the species under natural forest conditions in Oregon. Only one-fourth of the trees were found to be free from wounds. The rest had all been injured at one time or another by lightning, fire, frost-crack, etc., or by a combination of these, and as the wounds permitted infection by fungi, decay had set in. After the trees had reached eighty or ninety years of age, 70 per cent. were more or less badly wounded; and at 106 years, 80 per cent.; but serious decay of the timber rarely set in until about the age of 130 years. Fire, usually caused by lightning, is the greatest enemy. The management of the forest should be modified by the pathological conditions, as it is evident that much may be done to avert decay and destruction of valuable timber by timely removal of wounded and badly suppressed trees, and by fixing the felling rotation at 130 to 150 years.—*Nature.*

CORRESPONDENCE.

Peravanthanam Estate,
Mundakayam,
S. India.
5/12/16

THE EDITOR,
Planters' Chronicle,
Bangalore.

Dear Sir,—I beg to enclose cheque for Rs. 834/6/3 the proceeds of a Concert held in this Bungalow in aid of the *Planters' Chronicle* War Fund. I also enclose signed and audited balance sheet, which we would be glad if you could publish. as there have been so many complaints about unaudited War Fund entertainments. In apologising for the smallness of the amount realised, we would call attention to the fact that nearly all our young men are away, and the District is now a small one in point of numbers and only 30 people were present at the Concert. Further on analysing the balance sheet you will see that the cost of stage, and various props amount to over 300 Rs., and as the greater part of these props remain the property of the M. A. D. S., the next entertainment which we hope to hold at an early date, will be run far less expensively. If you have room in your paper we would be obliged if you could publish the balance sheet. The account of the Concert has been sent to the Madras papers as we quite recognise the fact that *The Planters' Chronicle* is not a fit place for frivolous matters of this kind.

Yours faithfully,
E. F. KIRK,
Hony. Secretary, M. A. D. S.

MUNDAKAYAM WAR FUND CONCERT.

Profit and Loss Account—Balance Sheet.

		Rs.	*a.*	*p.*
TO EXPENDITURE—				
,,	of Stage Props supplied by Mr. Hamond ...	84	12	0
,,	of do do Mr. Peckover ...	25	0	0
,,	of do do Mrs. Kirk ...	65	11	9
,,	of cost of stage (part paid by Mr. Vincent).	130	14	3
,,	of loss on catering	26	11	9
,,	of coolies employed	65	6	8
,,	of servants ,, ...	25	0	0
,,	of discount on cheques	15	5	0
,,	of cart hire on furniture	16	0	0
,,	of postages 11-5-6. Sundries 2-7-0 ...	13	12	6
	Balance at credit of P. and L. account ...	834	6	3
	Total Rs...	1,303	0	2
To cheque dated 4-12-16 sent to P. C. W. F. ...		834	6	3

By Receipts—		*Rs.*	*a.*	*p.*
,,	J. R. Vincent Donation Cost of Stage ...	90	0	0
,,	A. Hamond do do Props ...	11	0	0
,,	Donations to Concert Fund ...	635	11	0
,,	Auction Sale of Part of Stage Props ...	363	4	0
,,	Sale of Seats	109	0	0
,,	Breakages recovered	2	0	0
,,	Profits on Sale of Cigarettes	5	0	0
,,	,, Chocolates	35	0	0
,,	,, Drinks	25	15	2
,,	,, Programmes	24	12	0
,,	,, Garage and Stabling ...	1	6	0
	Total Rs...	1,303	0	2
By Nett Profit on War Fund Concert		834	6	3

E. & O. E.

E. F. Kirk,
Honorary Secretary of Mundakayam Amateur Dramatic Society.

H. M. E. Howson,
Chairman, M. P. A.

H. B. Kirk,
Vice-Chairman, M. P. A.

Audited and found correct.

Archulli, Mudigere P. O.,
Kadur District,
11—12—16.

Salonica Hospital.

Dear Mr. Norton,—If you can find space in the *Chronicle* for two enclosed letters will you be kind enough to publish them. Anything you can collect for me I will be most grateful for of course. I'm greedy for money for this, because I know it's really needed and there is anything but overlapping. My cousin is a doctor in one of the hospitals and the woman I know all about.

Yours sincerely,
Ethel Thomson.

Archullie, Mudigere P. O.,

Kadur District,

11—12—16.

TO ALL PLANTERS.

I have asked Mr. Norton if he will be good enough to publish Sister Swan's letter in the *Chronicle*. You will remember my appeal for funds for a hospital at Salonica some time ago. Sister Swan's (now Matron) letter will speak for itself.

The money is now all finished and I appeal to you all again to send me more and also to Coorg, Travancore and Nilgiri Planters who so far I have not appealed to, I ask for generous help. Any money sent to me will be most gratefully acknowledged. Last time I collected nearly Rs. 700—more than one planter sending me Rs. 100. I'd like that from you all!! but the "smallest contribution" will be gratefully acknowledged. It is due to the kindness and trouble taken by the Hon. J. O. Robinson of Messrs. Spencer & Co., Madras, who arranged everything for me through his agency at home that all the things were sent so promptly.

Yours truly,

ETHEL THOMSON.

(Copy).

38, General Hospital, Salonica,

30—9—16.

Dear Mrs. Thomson,—You cannot realise how much your generous gift meant to our sick at 28th Hospital. Miss Bilfore, our Matron, declares they saved many a life and I am quite sure they did in the G. & E. tents (the tents she was in charge of).

It was so nice to see our invalids lolling in the deck chairs provided by Mrs. Thomson's fund. We have a great deal to thank her for. I have been transferred to the 38th P. Hosp. and promoted to Matron, it is a Serb hospital—British is better—but the poor Serbs are a nice people although very ignorant and primitive. 50% of the orderlies are sick with malaria and dysentery and we were desperate for the proper nourishment for such cases when Lazenberg's 9 cases arrived, how I opened them and gave out the soup, jellies, etc.

Only the patients are Serbs, all the nursing staff and personnel are British so they come in for the gifts too. We get wounded in every day.

Yours very sincerely,

(Sd.) MARION SWAN.

This letter reached me a couple of weeks ago.

I propose sending half to this hospital and half to Salonica British hospital. Matron is up country now.

E. T.

The Planters' Chronicle.

RECOGNISED AS THE OFFICIAL ORGAN OF THE U. P. A. S. I., INCORPORATED.

(Secretary's Registered Telegraphic Address "Planting," Bangalore.)

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THE U. P. A. S. I.

(INCORPORATED.)

Contents.

We wish our Readers a Happy and Prosperous New Year and hope that during the coming year Peace will be restored on terms agreeable with the object with which The Empire entered into this War.

The Deputy Director of Agriculture, Planting Districts, who has returned to Head Quarters from Coorg, supplies us with an article on Local sales of Tea and Coffee, Tradiug in India within the Empire and Fertilisers.

He also continues the Report of his Agricultural Tour which deals with Tea and gives the prescriptions of washes in use in Northern India which should be used after the tea has been pruned.

We publish our weekly article on Markets, Prices and Statistics.

A short extract from the *Board of Trade Journal* on Rubber Industry in Brunei in 1915 is given.

We continue our article taken from *Tropical Life* on Coffee Planting for Profit.

With the question of freights occupying the minds of all planters, we are indebted to *Capital* for the following:—

"With regard to shipping Mr. Lloyd George emphasised that it was never so vital to the life of the Nation as at present, and Government felt the time had come to take more complete control of all the ships of Britain and place them practically on the same position as the Railways, so that shipping would be nationalised in the real sense of the term. The prodigious profits which were made out of freights contributed largely to the high cost of commodities."

SOUTH INDIA PLANTERS' WAR FUND.

	Rs.	A.	P.
Amount previously acknowledged	55,792	8	2
Messrs. Barber and Pascoe	75	0	0
Mr. A. Yates	60	0	0
Mr. J. S. Wilkie	120	0	0
Total...	56,047	8	2

SCIENTIFIC DEPARTMENT, U. P. A. S. I.

Local Sales of Tea and Coffee.

The Deputy Assistant Director of Supplies, IXth Division, Ootacamund, called for tenders to be opened at noon of the 15th December for the supply of 141,500 lbs. of Indian grown black tea, and 247,360 lbs. of coffee for delivery between 15th February and 15th April 1917.

We trust that the Nilgiri Planters' Association have seen to it that this local demand has been promptly supplied and trust that it will be followed by more.

Trading in India within the Empire.

The Rubber World states that the Secretary of State for India has authorised the Indian Committee of the Imperial Institute to enquire into and report on the possibilities of further extending the industrial and commercial utilisation of Indian raw materials in England and elsewhere in the Empire. The Committee has already commenced its work and has appointed a number of Sub-Committees to deal with the more important groups of materials, to consider the results of investigations and enquiries already made by the Imperial Institute, and to obtain the view of leading merchants, manufacturers, and other users of the raw products of India. One of the important aspects of the Committee's work will be to suggest openings for the employment of those Indian materials which, before the war, went to enemy countries.

Fertilisers.

Nature says that the statistics given in the half-yearly Review of the Movement of Fertilisers and Chemical Products, just issued by the International Institute of Agriculture, show very clearly the effects of the war on this branch of industry. Shipments of natural phosphates are diminishing both on account of the scarcity of labour and the high rates of freight. As regards superphosphate of lime, the small supply of raw phosphates and the ever-increasing demand for sulphuric acid for munitions of war have depressed the output in all countries, notably in France, where the latest figures show a decrease of 70 per cent on the production of 1913. The increase in the exports of Chilean Nitrate, which began in the latter half of last year, has continued, so that the figures are now much nearer to the normal than was the case earlier in the war. France is now importing three times as much nitrate as in 1915, and the same applies in various degrees to all the importing countries, but the increased demand is entirely for industrial purposes. The manufacturers of synthetic nitrogenous fertilisers have almost everywhere augmented their output considerably, either by development of existing plant or by new construction. Very little, if any, of the supplies are available for agricultural purposes; in some countries the State requirements absorb the whole output.

RUDOLPH D. ANSTEAD,

Deputy Director of Agriculture, Planting Districts.

DEPUTY DIRECTOR OF AGRICULTURE'S TOUR.

(*Continued.*)

Mr. McRae concluded his address as follows:—

"I saw a field of seed bearers to-day and found less blight than anywhere else on my tour. I also saw how the seeds are gathered and dealt with. In the Wynaad there is no danger of spreading these two blights by seed. I think it may be taken as correct that every estate has them to some extent, fortunately in most cases to very slight extent. But I would advise disinfecting seed before sowing when it is got from outside the district. I am not warning you against any particular district when I say this, but recommend the procedure as a safe practice. Steeping for 15 minutes in 2% commercial formaline will render seed safe from any spores of a parasitic fungus that may be adhering to them."

Mosquito Blight.

Throughout the district a little Mosquito Blight was to be found, a bush here and a bush there being attacked. The black dots on the leaves caused by the puncture of these insects are quite distinctive to the brown patches caused by Brown or Grey Blight and are easily recognised. The insects attack young leaves and new flush principally.

Probably this pest has been present in the district for many years. Something in the climate or rainfall apparently keeps it in check and judging from past experience it is not likely to become troublesome. Nevertheless a close watch should be kept on it for it is a pest which is capable of causing a considerable amount of damage. Should it get bad on any particular bit of tea the bushes should be pruned and the prunings burned, and catching of insects resorted to on the surrounding test.

Manuring and Pruning of Tea.

In some places the Tea showed unmistakable signs of needing manure. The loss in yield is usually not the first sign of this need for manure, for this can often be maintained by closer plucking. The first noticeable thing as a rule is the change in colour of the foliage. A healthy tea plant, growing vigorously, has a darker appearance than an unhealthy plant, and the leaves have what may be described for want of a better word an "oily" appearance. At the beginning of the season the *whole surface* of healthy tea is growing, each shoot even in the outer parts of the bushes throws out a new growth which is vigorous and has oily looking dark green leaves. If the general colour of the tea is yellowish, if the difference in growth vigour at the outside of the bushes and in their centres is marked, if the shoots cease to grow and turn banji, these are signs of decline and want of plant food in the soil.

The appearance of the wood as well as the leaves and growth should also be watched. Nearly all tea bushes have lichens and moss on their stems, but these only occupy a part of the surface; and it may here be stated that such growths are not parasites. They do not enter the tissues of the stem or take anything from the bush. They use the stems of the tea bush merely as a support and convenient resting place, and they are known botanically as *epiphytes* in contradistinction to parasites like the Brown Blight for instance, and the utmost harm that they do is to partly choke the breathing pores of the bark. These epiphytic growths will be found on most tea bushes, but they occupy only a *part* of the surface of the stem, but in unhealthy plants it will be found that they are apt to spread over the *whole* surface of the stem giving the wood a white or greyish appearance which is generally described as "hide-bound." In this case the leaf growth ceases to a large extent, except from the younger wood at the top of the bushes, making the bush appear hollow. The wood becomes thin and whippy and white instead of thick, vigourous, and red.

These are obvious signs of unhealthy conditions often due to want of manure, or lack of soil tilth, and bushes in this weak condition are more apt to be attacked by fungoid diseases like Brown Blight that those in a healthy growing condition, and worse still do not recover quickly from such attacks. Many bushes were shown me in this condition, and they are popularly described as "anæmic" bushes. I find that it is the custom on many estates to leave such bushes unplucked for a while with the object of allowing them to recover and form wood which can be pruned on to. When this is done I find that in many cases, at any rate, the left bush throws up shoots from high in the bush and often above old snags and knots and when pruning time comes can only be pruned above such snags. As a rule, therefore, I have in the past disapproved of this system of leaving bushes. I was shown during this tour however a field where a large number of bushes had been left and here the majority of them had thrown out good strong shoots from low down and they can now be pruned into well shaped bushes. A similar experiment in the Peermade District has produced much the same result and has been a success. In how far the experiment referred to will be a success will of course only appear when the field is pruned down and the number of bushes whieh still have to be collar pruned is ascertained.

If left bushes will throw out new shoots low down this method of leaving them is to be advised, but the fact remains that in some places and on some soils shoots are not thrown out low down and in this case collar pruning at the first is the best plan. It may be said here that a bush which does not throw out shoots low down may often be induced to do so by "notching." A cut is made through the bark into the wood of the stem so as to sever the sap vessels. The sap then induces the sprouting of latent buds situated below the notch.

In my opinion single stem bushes should not be encouraged. The object should be to make a tea *bush* and not a tea *tree*. Cutting the main stem of the young plant low down is the first step towards making a bush and this first cutting should be done at four inches in preference to six. When collar pruning is resorted to the cut should be made as low as possible and the earth should be cleared away to allow the young shoots to spring up. Many old bushes which have deteriorated for some reason or another and are full of snags and old knots and rotten wood can only be restored by such collar pruning.

It must never be forgotten that pruning and manuring are closely interdependent. Heavy pruning is undoubtedly a more severe check to bushes than light pruning, but if manuring is to be done the benefit of the manure, which is an expensive item, can only be obtained if there is a clean run of sap and if the bushes are kept as free as possible from undesirable wood and unproductive shoots. All snags and knots must be removed at all costs. A system of pruning which has been adopted on many estates in which a special gang of the best pruners on the estate follow up the ordinary pruning gang and go over and touch up each bush after the heavy wood has been removed, take out any knots left and make sure that cuts are smooth and clean, is a good one to adopt. It renders pruning more expensive it is true but it pays in the long run, especially when expensive manures are to be applied.

It has been said above that the epiphytic growths on the tea stems do comparatively little harm, but the tea is undoubtedly better without them. They clog up the breathing pores of the bark and also act as repositories for the spores of fungi. At every pruning season therefore an attempt

should be made to get rid of these growths and to clean the stems. A common custom is to dust the stems with Lime or scrub them with Lime water. This kills the epiphytic growths for the time being, but it has little permanent effect. The following washes are being used in Northern India with good effect on the health of the Tea :—

(*a*) 2 lbs. 98% Caustic Soda in 10 gallons of water. This gives a clear solution and can be used as a spray if necessary.

(*b*) 7 lbs. Washing Soda crystals and 2 lbs. quick lime in 10 gallons of water.

(c) 2½ lbs. Carbonate of Soda and 2 lbs. quick lime in 10 gallons of water.

These washes should not be applied to green wood but used on the old stems after the tea has been pruned.

It would be well to adopt such methods of pruning, freeing the bushes from all old wood and knots. centering out and removing all useless wood, cleaning the stems, ete , in all cases where manuring has been or is to be adopted in order that the full benefit of the manure may be obtained. If such methods are not adopted much of the cost of the manure is wasted and the bushes do not benefit by its application to the full extent that they might do.

Another consideration is the place that Lime should find in all systems of manuring. A large number of soil samples have now passed through the Bangalore laboratory and in nearly all cases the soil proves to be acid, to contain large quantities of oxides of Iron and Aluminium, and to be deficient in available Phosphoric acid. This is only a general statement and no doubt there are numerous exceptions, but the general type of tea soil in Southern India is one which requires Lime and soluble Phosphoric acid more than anything else. Manurial systems based on this assumption have been very successful in more than one district. The general idea of the system is to apply at the time of pruning 500 to 800 lbs of good slaked lime per acre with one cwt of phosphate like Basic Slag and 50 lbs of Sulphate of Potash. Some six months later a good general fertiliser is applied.

Lime undoubtedly has a most beneficial effect on our soils. It not only neutralises the acidity and makes the soil of a suitable medium for the beneficial bacteria that recent study has shown to be such an all important factor of fertility, but it also sets free the phosphoric acid and potash combined in insoluble forms with the iron and alumina so that it becomes available to the Tea. The above system of manuring has of course been upset by war conditions. Basic Slag is difficult to obtain at the present time but its place may be taken by Superphosphate or even Basic Bone Superphosphates. Sulphate of Potash has reached a price which renders it absolutely prohibitive, but ashes can be collected systematically and applied with good effect and the main outline of the system remains and can be adopted to a large extent.

(To be continued.)

RUDOLPH D. ANSTEAD,

Deputy Director of Agriculture, Planting Districts.

MARKETS, PRICES, AND STATISTICS.

Coffee.

Messrs. T. H. Allan and Co.'s Report dated 29th November states that offerings have been light and prices in many cases rather better. Some bought in and second hand lots of Mysore have been sold at prices showing an advance of 1/- to 2/- on recent rates and fully 5/- to 7/- over what the Coffee was nominally worth when it arrived in the summer.

Nothing is doing in crops "to arrive;" sellers being naturally nervous about freight. "Plantation" would be worth about 74/-C. i. f. Marseilles; "Malabar" about 77/6; and "Mysore Native" 78/6. The "COMRIE CASTLE" is now landing a fair quantity of East African.

The Mysore Chamber of Commerce Weekly Report dated 8th December states that there is still no local demand and prices are more or less nominal. Price per maund of 26½ lbs.; Peaberry ranges from Rs, 15 to Rs. 17; Parchment Rs. 11/8; Native Rs. 10/8. Chickmaglur quotes, Peaberry from Rs. 14 to Rs. 14/8; Native No. 1, from Rs. 11 to Rs. 11/4; Native No. 2 from Rs. 10 to Rs. 10/8 per maund of 28 lbs. Madras quotes Rs. 200 to Rs. 230 per 500 lbs. Bombay quotes for malbari Rs. 18 to Rs. 20 per maund.

Tea.

Messrs. T. H. Allan & Co.'s Report quoted above states that the market on the whole has been strong with higher prices all round until the week ending 28th November when there has been less activity, and prices, especially for the lower grades, have not been maintained.

The following prices were obtained for South Indian Tea at the London sales of 13th, 15th, 20th, 22nd, 27th and 29th November.

—	B.O.P.	O. P.	B. P.	Pek.	P. S.	P. F.	Fgs.	Dust.
TRAVANCORE.								
Lockhart ...	1/-¾	...	11¾*	11¼*	...	...	11¾	...
	1/4¼	...	1/-¾	...	...	...	...	...
Pullikanum ..	9¾	10¼	...	9¾	9¼	...	9	...
Periakanal ...	...	...	11½	11	10¼	...	...	...
Nullatanni ...	...	...	11½	...	10¾	...	...	...
	...	...	1/-¼*	...	11¾	...	...	...
Venture ...	11¼	...	...	10¾	10¼	...	...	...
	11¾	...	...	11	10¾	...	...	...
Chokanad ...	...	...	11¾	11¼	10¾	11½	11¾	...
Fairfield ...	11¼	...	11¾	10½	...	...	...	...
Bonami ...	1/-	...	11¼	10¼	...	...	...	...
	1/-½	...	11¾	11	10½	...	...	...
	11¾	...	11½	10¾	...	...	...	...
Periavurrai ...	...	...	1/1	...	...	1/-½	...	...
	...	...	1/1	...	...	1/-¼	...	...
Corrimony ...	...	...	11¾	11	10¼	...	...	...
Sevenmallay ...	...	...	1/-¾	...	11	...	...	...
Balamore ...	...	...	11¾	11	10½	...	...	...
Yellapatty ...	...	...	...	...	...	...	1/-¼	...
Surianally ...	1/1	1/-	1/-½	11¾	...	1/-½	...	...
	1/1½	...	1/-¾	1/-½	...	1/-¼	...	...
Kolliekanum ...	1/-¾	...	11¾	11¼	...	...	...	...
	1/1	...	11¾	11½	...	...	...	...

—	B.O.P.	O. P.	B. P.	Pek.	P. S.	P. F.	Fgs.	Dust.
TRAVANCORE.								
Pambanar ...	...	...	1/-	11	10	...	...	...
	...	...	11¾	11	10	...	...	...
Kalaar ...	...	...	11½*	11¼	...	...	...	...
Letchmi ...	...	...	1/-½	...	...	1/-¼	...	...
NILGIRIS.								
Nonsuch ...	1/1	1/-¼	...	1/-	...	...	...	...
Mayfield ...	11½*	...	...	10¾	...	...	11	10¾
Periashola ...	10½	10½	9½	9¾	...	...	...	...
Woodbriar ...	1/-¼	11¼	11¼	10¾	10½	...	...	...
Barwood ...	1/-¼	...	10¾	...	10	...	...	...
Cherakara ...	...	11¼	11¾	11	10¾	...	10¾	...
Seaforth ...	11¾	11	11½	...	...	...	...	...
Daverashola ...	...	...	1/-	11	10	...	...	...
	1/3	...	1/-½	...	1/-¼	...	...	...
WYNAAD.								
Kardoora ...	11¾	...	11	10¼	...	...	...	10
Chuloka ...	11¼	...	10¾	...	10	...	...	...
Chundale ...	1/-	11¾	11¾	11½	10¾	...	...	...

* Withdrawn from sale.

Rubber.

Messrs. T. H. Allan & Co's. Report quoted above states that the market has been strong with keen buying for American account and prices advanced to 2/10½ for both Crepe and Sheet.

The following quantities of Rubber were imported into the United Kingdom during the month of October in centals of 100 lbs.

	1916.	1915.
From Dutch East Indies ...	8,496	5,296
From French West Africa ...	376	1,600
From Gold Coast ...	1,226	690
From other African Countries ...	8,958	5,848
From Peru ...	7	506
From Brazil ...	17,998	31,009
From India ...	4,455	2,084
From Straits Settlements ...	27,135	52,117
From Federated Malay States ...	31,071	35,502
From Ceylon ...	15,990	22,198
From Other Countries ...	2,584	2,749
Total Imports ...	118,296	159,599

The following quantities were exported during October in centals of 100 lbs. :—

To Russia	336	13,026
To France	18,781	13,464
To America	34,602	51,794
To Other countries	13,755	10,746
Total Re-exports ...	67,474	89,030

Spices.

Pepper.—The prices in the home market have been dearer, fair Tellicherry 10¼. *The Mysore Chamber of Commerce Report* quotes prices ranging from Rs.13 to Rs.14 for 25 lbs. Saklaspur quotes Rs.12 per maund.

Cardamons.—The home market is still very quiet. The local price is Rs.20 to Rs.25 per 25 lbs.

R. D. A.

BRUNEI.

Rubber Industry in 1915.

In his report of the trade, etc., of Brunei in 1915, the British Resident there writes that the Export of Rubber from the State which only commenced in 1914 with 1,160 lbs. from Malay and Chinese Plantations near the town of Brunei, and 5894 lbs. from a plantation on the Labu, developed considerably during the year under review. Several more of the plantations near Brunei town reached the producing stage and the amount exported from the district rose to 20,560 lbs. In the Temburong district the yield from the estate on the Labu increased to 31,775 lbs. while a firm in the Brunei estate which started tapping on 1st July, exported 3,728 lbs. before the end of the year. On the Batu Apoi estate a company erected a factory and other buildings and all preparations were made to start tapping over a small area in the new year. The areas planted and producing on these estates at the end of the year stood as follows :—

	Area planted. Acres.	Area Producing, Acres.
Brunei Estate	475	120
Labu Estate	400	283
Batu Apoi Estate	415	—

With the rise in the price of rubber that occurred in the latter half of the year the people who had followed Government advice in the early days began to reap their reward. Hopes of similar success on the part of others, who now saw evidence of profits from rubber plantations, resulted in a miniature boon; most of the land available in the immediate neighbourhood of Brunei town was taken up and the last few months of the year saw great activity in clearing and planting.

Applications for land came from all classes of the community and were, as a rule, approved only on the condition that the applicants should not confine their energies to rubber, but should plant a portion of their holdings with more homely products.—*Board of Trade Journal.*

COFFEE.

Coffee Planting for Profit.

GENERAL NOTES.

Planters, or would-be planters of coffee, will remember that the coffee industry was as important to Java prior to the appearance of the coffee blight (*Hemileia vastatrix*) as it was to Ceylon, only in the case of Netherlands island the planters instead of giving up coffee for another industry, did their best to control the trouble by cultural methods and also by the help of the spray machine and fungicides, and then, believing that prevention is better than cure, new species were introduced from abroad in the belief that they would prove immune to the disease, and so help to rehabilitate the industry. "Two of these varieties" Mr. J. P. Wester tells us in the article that he has published in the Philippine *Agricultural Review* under the heading of "Coffee Industry in Java" "attained commercial importance, *viz.*, *C. liberica* and *C. robusta* but after extensively planting the first kind because it was considered blight resistant, it was found to become subject to the disease to such an extent that its cultivation has practically been abandoned in favour of Robusta."

According to Mr. Wester, the Java output of coffee for the five years 1910—1914 was made up of the three following varieties :—

Tons of 1,000 kilos.		Including.		
	Total Production.	Arabica.	Liberica.	Robusta.
1914 ...	48,436	11,941	2,227	34,268
1913 ...	25,885	4,555	3,123	18,207
1912 ...	30,527	11,631	3,339	15,557
1911 ...	17,504	6,177	3,661	7,666
1910 ...	10,559	4,552	4,146	1,861

The above table illustrates three features, *viz.*, the uncertainty of Arabian coffee, the steady decline of Liberica and the very marked increase in the production of Robusta.

For all practical purposes, we are told, the coffee grown in Java can be divided into four groups, say,

(1) *Arabica* and related coffee.
(2) *Liberica* including *excelsa* and *abeocutæ*.
(3) *Robusta* with which may be included *C. canephora*, *C. quillou* and *C. ugandæ*.
(4) *Hybrids*.

Turning to p. 14 we see that when the coffee blight appeared in Java efforts were made to control the disease, as already stated, by searching for varieties that might prove immune or resistant to the disease and among the species introduced were the follow :—

C. Robusta, *C. quillou*, *C. phora*, *C. canephora*, var. *madagascariensis*, *C. canephora*, var. *q uensis*, *C. canephora* var. *saukurensis*, *C. laurentii*, *C. ugandæ*, *C. ongensis*, *C. congensis* var. *chalotii*, *C. bukobensis*, *C. bengalensis*, *C. stenophylla*, *C. densiflora*, *C. pereiri*, *C. schumanniana*, *C. liberica*, *C. arnoldiana*, *C. dewevrei*, *C. dybowskii*, *C. excelsa*, *C. abeocutæ*, *C. aruwiminiensis*.

Besides the above there are several varieties of *arabica* and some hybrids. Since 1907, when the selecting and testing experiments were first started, several superior strains have been developed. With the above considerable variation has been found, and it is becoming generally recognised that grafting from individual superior trees must be resorted to in

order to obtain the best results. In the cultivation of the hybrids this operation is, in fact, absolutely necessary, since all the hybrids that have fruited so far fail to come true to seed and reproduce an exceedingly variable progeny, which is, in most instances, inferior to the hybrid parent. One of the most interesting tests being carried out in Java is, or was, one to determine the most profitable height for topping the different species and varieties.

Other notes worthy of the planter's attention when studying Mr. Wester's pamphlet, (which, by the way, is accompanied by a number of excellent full-page illustrations, showing full grown and topped trees of various species, etc.), are the following, among others: *Arabica* is the only coffee that does not require artificial drying. *Liberica* requires a special pulper; 10 kilos produce 1 kilo of marketable coffee, against 8 kilos to 1 with *abeocuta*, 4½ to 1 with Robusta and 8½ kilos. with the Kawisari and Kalmia's hybrids. The robusta as shown by the table, is now the coffee most extensively cultivated in Java, and the idea that this variety was mainly or even largely cultivated only as a catch-crop with rubber is incorrect. Robusta gives by far the best yield and under exceptionally favourable conditions has given as much as 1,700 to 2,300 kilos per hectare (2½ acres) but the best quality is below *arabica*, and, according to Wester, even below the best grade of *liberica*. Under favourable circumstances, the *quillou*, although a very capricious variety gives far better results than robusta; in some cases therefore, it is well worth a trial but the planter must not be surprised if the results are exactly opposite to what he expected, or nearly so. C. *ugandæ* is reckoned, perhaps, to be the most blight resistant species of the robusta group, of which it is also the hardiest and the one most adapted to adverse conditions. The best distance to plant is considered to be 2·1 to 2·6 metres apart. The quality of some of the hybrid coffees has proved to be excellent. All coffee in Java is topped at from 2 to 2·4 metres above the ground, and subsequently kept at that height. The first plate included by Mr. Wester shows a full grown, topped tree of the robusta type, shaded by malaganit (*Leucæna glauca*), and which being planted somewhat farther apart than is customary in field practice, is surrounded with *Centrosema plumieri* as a cover-crop. *Leucoena glauca*, it seems, is used almost exclusively for shade, and one of the most interesting features to Mr. Wester in connection with coffee in Java was the utilisation of this tree as shade, instead of using a plant shed made of bamboo.

The Dutch Government has ceased to encourage the cultivation of the new coffees by the natives, partly because, without constant supervision, the Javanese do not give the trees all the attention they require, and partly that owing to the necessity of artificial drying instead of being dried in the sun, as the natives have been used to with *arabica*, these new coffees are considered to be best adapted for the large plantations under European control.

Mr. West considers that the cost of upkeep of a plantation in a given locality is about the same for all coffees. The expense of starting a hybrid coffee plantation is slightly higher than for *robusta* or *liberica* because of the grafting operation. The cost of harvesting the *liberica* and the hybrids is somewhat higher than robusta, because more berries are required per 100 kilos of marketable coffee.

There is much more information to be gathered from this pamphlet, to which we shall probably return several times as we go along, but must break off for this issue.—*Tropical Life.*